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PHYSICIAN AND NEUROLOGIST TO GUY'S HOSPITAL.

LECTURE I.—CUTANEOUS SENSIBILITY AND CUTANEOUS ANÆSTHESIA.

MR. PRESIDENT AND GENTLEMEN,—When I received the honour of being invited to deliver the Croonian lectures it seemed to me right that I should attempt to apply some of the lessons I had learnt during the war to the problems of civil life. I was fortunate in having almost unique opportunities for investigating the neuroses, which occurred so frequently under the exceptionally trying conditions the British Army had to face on every front. In the course of my investigations on their origin and nature I made a number of observations which throw, I believe, some light on the psychology of the special senses and the physiology of the reflexes associated with them. As the most common neurosis affecting the special senses was hysteria, and as my views on the nature of hysteria differ from those held by the majority of neurologists, it will be necessary to explain what I mean by hysteria before I approach the main subject of these lectures.

NATURE AND DEFINITION OF HYSTERIA.

The word hysteria was first used by the Greek physicians to describe what is now known as an hysterical attack, under the impression that it was due to an actual displacement of the uterus into various parts of the body. In course of time numerous other conditions were recognised as being of a similar nature, and the word hysterical was used to describe them all. The etymology of the word coloured all the theories of the nature of hysteria up to the time of Charcot, almost every writer believing that it was associated with pelvic disorders and that it occurred only in women. Charcot, however, showed that it was not uncommon in men, and the earlier idea of its relation in women to pelvic disorders has been gradually discarded. The conception of the disease which I shall use in these lectures has nothing in common with the original one, and it might therefore be considered wise to use some other term than hysteria to describe it; but since this word has been accepted for so long a period by physicians in every country, it would be impossible to introduce any new term which would obtain universal approval. The word hysteria is indeed no more unsuitable than such words as rheumatism and chorea, which have also lost their original significance.

One common factor in all the symptoms, which are by universal consent regarded as hysterical, is their origin as a result of suggestion. When the history of each case is carefully investigated it is almost invariably possible to discover that some event or condition suggested its onset and led to the exact form of the symptoms present. If the view be accepted that hysterical symptoms are caused by suggestion, they must be capable of removal by psychotherapy without assistance from any more material method of treatment. We can thus state that an hysterical symptom is one which has been produced by suggestion and is curable by psychotherapy.

Physical Stigmata.

Gendrin, in an address to the Académie de Médecine in 1846, stated his belief that "hysteria is not only characterised by spasmodic attacks occurring at intervals, but it is a continuous disease, which in the intervals always presents characteristic symptoms," the most important of which "is a state of general or partial insensibility." Gendrin's views were to a great extent forgotten until they were revived by Charcot in 1871. Charcot taught that hysteria manifests itself in two ways—by persistent symptoms or stigmata, of which the patient is unaware, and temporary symptoms, which are obvious to the patient and lead him to seek medical advice. The former were supposed to be present before the latter appeared and to persist after they had disappeared. Amongst these stigmata the most constant, according to Charcot, were retraction of the field of vision, certain forms of cutaneous anæsthesia, and pharyngeal anæsthesia. His teaching soon became universally adopted, and few books on neurology or general medicine published in the last 50 years fail to mention these stigmata.

One of Charcot's most distinguished assistants, Babinski, was the first to throw doubt upon the importance of the stigmata he described. Babinski believes that they are not permanent symptoms at all, but, like the more obvious and temporary symptoms, are produced by suggestion. Instead of being produced by suggestion on the patient's part, they are the result of suggestion on the part of the physician. The evidence brought forward by Babinski in connexion with anæsthesia and retraction of the field of vision appears to me to be conclusive, and receives further confirmation from the investigations which I shall presently describe. We have obtained similar evidence with regard to pharyngeal anæsthesia, so that the question of physical stigmata may be regarded as settled.

It is so common to regard certain mental qualities as hysterical and to apply the term hysterical to a certain type of individual that it requires considerable courage to reject altogether the doctrine of a specific psychical disorder to which the name hysteria can be given. But on examining the literature it is at once apparent that no sort of unanimity exists as to what are the specific mental attributes of hysteria. For several years I accepted the definition of hysteria as an abnormal mental condition in which the individual is unduly prone to develop symptoms as a result of suggestion. But the experience of the war has taught us that, given a sufficiently powerful suggestion, there are probably no individuals who would not develop hysterical symptoms.

Abnormal suggestibility, like other mental attributes commonly regarded as characteristic of hysteria, is undoubtedly a most important predisposing cause of hysterical symptoms, but it is not an essential factor, and cannot therefore be regarded as an essential part of hysteria. As it may exist in an individual who never shows any hysterical symptoms owing to the absence of adequate exciting causes, abnormal suggestibility cannot be regarded as a disease, such as hysteria would designate, any more than irritability or any other mental attribute is a disease. Unless everybody can be regarded as a victim of hysteria, as everybody is liable under sufficient provocation to develop hysterical symptoms, suggestibility is not the mental basis of hysteria. Whether a given person will develop hysterical symptoms under given conditions depends on the degree of his suggestibility and the strength of the suggestion. It is clear therefore that abnormal suggestibility is simply a predisposing factor, and is no more a part of hysteria than a tuberculous family history is a part of tuberculosis. Many cases of gross hysterical symptoms occurred in soldiers who had no family or personal history of neuroses, and who were perfectly fit until the moment that one of the exceptionally powerful exciting causes, such as occur comparatively rarely apart from the war, suggested some hysterical symptom. After its disappearance as a result of psychotherapy the man was once more perfectly fit, and his subsequent history showed that he remained no more liable than any of his companions to develop new symptoms.

As soon as it is recognised that the mental stigmata which predispose to the development of hysteria are not themselves a part of hysteria, it becomes obvious that many cases of hysteria will be missed if it is only looked for in so-called hysterical persons. When, on the other hand, it is remembered that there is nobody who may not develop hysteria if the provocation is sufficiently great, it must follow that hysteria is infinitely more widespread than has generally been supposed.

We thus arrive at the conclusion that, apart from actual hysterical symptoms, there are no underlying physical or mental symptoms or group of symptoms, which precede and accompany them and persist after their disappearance, to which the term hysteria can be applied. It is clear therefore that while it is easy to define hysterical paralysis and hysterical anæsthesia, as they have certain attributes which distinguish them from all other forms of paralysis and anæsthesia, "hysteria" cannot exist in their absence. The only possible definition of hysteria is "the condition in which hysterical symptoms are present," hysterical symptoms being in turn defined as "symptoms which result from suggestion, and are curable by psychotherapy"; hysteria is thus a condition in which symptoms are present which have resulted from suggestion and are curable by psychotherapy.

I.—CUTANEOUS SENSIBILITY AND CUTANEOUS ANÆSTHESIA.

(1) *Hysterical Anæsthesia Following Hetero-Suggestion.*

I have already described how Charcot believed that cutaneous anæsthesia was a stigma of hysteria, which was present before any more obvious hysterical symptoms developed and persisted after their disappearance. It had three characteristic features: Firstly, it was rarely, if ever, recognised spontaneously by the patient, and was only discovered in the course of the physician's examination. "Hemi-anæsthesia," wrote Charcot, "is a symptom which requires to be sought for. There are many patients who are quite surprised when its existence is revealed to them." Secondly, it never caused any inconvenience to the patient, who was able to perform movements with normal accuracy so long as no paralysis was associated with it, and it never led to accidental burns or other injuries. Lastly, it always occurred in certain characteristic areas, such as one-half of the body, the whole of a limb, or the area covered by a glove or stocking. (Figs. 1, 2, and 3.)

Doubt was first thrown on the truth of Charcot's view by Herbert Page, who in his book on "Railway Injuries," published in 1891, asked the question, "May not sometimes the very examination of a hemi-anæsthetic patient largely determine the hemi-anæsthesia?" And he then observed that "the examination of a patient may sometimes produce the suggestion whereby anæsthesia results."

Nine years later Babinski failed to find any disturbance in tactile, painful, thermal, muscular, and stereognosis sense in any of a hundred consecutive cases of hysterical disorders, in which he was careful to avoid the possibility of suggestion. He concluded that the anæsthesia Charcot had described as so characteristic of hysteria was not recognised spontaneously by the patient and did not cause him any inconvenience, simply because it was not present until it had been unconsciously suggested by the observer in the course of his examination.

Babinski went so far as to state that there is no such thing as hysterical anæsthesia apart from that produced by the suggestion of the observer. In a paper on the subject published in 1908, I accepted Babinski's teaching without reservation, but from time to time since then I have seen cases in which hysterical anæsthesia appeared to have developed without any possibility of hetero-suggestion by a second person. These isolated cases remained unexplained until recently, when I gradually came to recognise that certain entirely different classes of hysterical anæsthesia exist, which differ from the only form described by Charcot and the authors of most text-books of medicine and neurology by showing none of the three characteristic features mentioned above. The patient is well aware of the existence of anæsthesia before he is examined; it causes more or less inconvenience and may lead to accidental burns and other injuries, and the areas of anæsthesia differ materially from those hitherto regarded as the only ones occurring in hysteria. The hysterical nature of these varieties of anæsthesia, which I shall presently describe in greater detail, may be extremely difficult to recognise, as the anæsthesia is always a sequel of the anæsthesia caused by some organic condition, and resembles the latter in all its details.

In 1917 I carried out some investigations with Mr. R. Gainsborough on the classical forms of hysterical anæsthesia described by Charcot. Twenty-nine healthy and intelligent individuals, of whom 25 were medical students, who had, however, not yet worked in the wards or read any clinical medicine, were asked to pretend that they had been in a railway accident, and that they were attempting to swindle the company by claiming compensation because of paralysis of the right arm and leg, which they alleged had resulted. They were to act as well as they could the part of men trying to persuade the medical examiner that they were really suffering from paralysis.

We first asked them whether there was anything else of which they complained besides paralysis of the arm and leg. The large majority said they were quite sure there was nothing else, even after being pressed for details. These results correspond with what occurs in patients suffering from hysterical paralysis. If they have not previously been examined they hardly ever volunteer that they have any anæsthesia. The following leading question was then asked: "Can you feel as well on your right side as on your left?" Twenty-two out of 27, including 2 who had spontaneously complained of numbness and 1 of coldness, said they felt less on the right side than the left. Another said he felt tingling on the right side. The remaining 4 said they had noticed nothing. This agrees with an observation made by Yealland, which I have since confirmed on numerous occasions. On asking a great number of non-medical individuals the following question: "Supposing you had loss of power in your wrist, fingers, and thumb, would you, or would you not, lose feeling?" the answer he obtained was always in the affirmative. When asked what would be the limits of the loss of feeling, a line was drawn round the wrist and less frequently round the forearm,

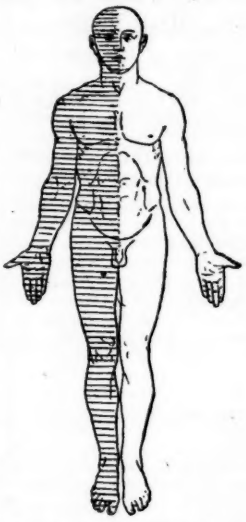

FIG. 1.—Hemianæsthesia in a man with hysterical fits. (After Charcot.)

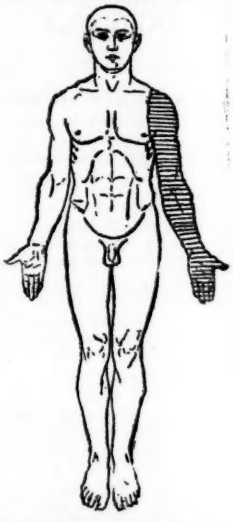

FIG. 2.—Sleeve anæsthesia in hysterical traumatic brachial monoplegia. (After Charcot.)

elbow, or shoulder. The replies to our leading question in the 27 "malingerers" correspond with the first stage in the production of hysterical anæsthesia, the idea of which first enters the patient's head when he is asked questions on the subject.

Cutaneous sensibility was then roughly tested. Six of the "malingerers" had right hemi-anæsthesia (Fig. 4), 5 had complete right hemi-anæsthesia except the face, 12 had anæsthesia of the whole arm and the whole leg (Fig. 5), 1 had hyperæsthesia of the whole arm and

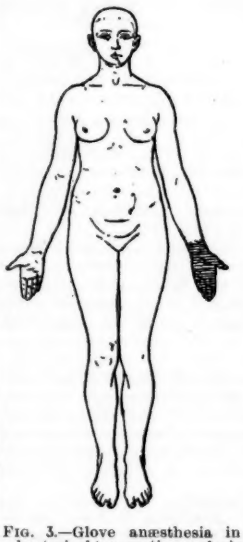

FIG. 3.—Glove anæsthesia in hysterical traumatic paralysis of hand. (After Charcot.)

FIG. 4.—Hemianæsthesia in "malingering" hemiplegia.

whole leg, and 4 had no anæsthesia. Seven were asked what the area of anæsthesia would be if only the hand and foot were paralysed: all replied that they would have anæsthesia of the distal part of the limb only, and

marked out typical glove and stocking areas at various points up the wrist and forearm and ankle and leg respectively (Fig. 6). I asked several other individuals what area, if any, of anæsthesia they would expect to accompany paralysis of the hand, forearm, and whole arm respectively. In most cases the area corresponded with the extent of the paralysis, glove anæsthesia occurring with paralysis of the hand, anæsthesia up to a line drawn round the elbow in paralysis of the forearm, and anæsthesia of the whole arm up to a line drawn through the axilla and over the shoulder with paralysis of the whole arm.

The results of these investigations correspond with the second stage in the production of hysterical anæsthesia. An investigation of cutaneous sensibility in suggestible individuals is very likely to produce anæsthesia, especially if the way has been prepared by questions on the subject, though this is not an essential preliminary. The area of anæsthesia corresponds with the individual's own ideas, just as in these cases of experimental malingering. Figs. 1 to 6 show areas which are generally regarded as typical areas of hysterical anæsthesia; they are really nothing more than the areas which anybody without knowledge of physiology would expect to become anæsthetic when

FIG. 5.—Anæsthesia of whole arm and whole leg in "malingering" hemiplegia.

FIG. 6.—Glove and sock anæsthesia in "malingering" hemiplegia.

the limbs are paralysed, the same individual variations being seen in these cases of "malingering" as in different cases of hysterical paralysis.

(2) *Hysterical Anæsthesia Following Stupor.*

A condition of stupor was not uncommon in soldiers who were exposed to some exceptional emotional disturbance when their resisting power had already become lowered by prolonged exposure to terrifying experiences, especially if they were suffering from great physical fatigue, the result of strenuous exertion, want of sleep, and perhaps insufficient food. In this condition the patient's mind appears to be so absorbed with his own innermost thoughts that he gives no attention to the external world. He appears to see, hear, and feel nothing. He does not blink when a stick is waved in front of his face, nor jump when a loud noise is made just behind him. He pays no attention to tickling or to painful stimuli applied to his skin. Sooner or later spontaneous recovery occurred in most cases. After a period of confusion the patient became normal in every way, and his vision, hearing, and sensibility to all forms of cutaneous stimuli returned. In most cases the intermediate period of confusion was very short, but it was sometimes prolonged. If during this period the patient happened to be under a medical officer, whose clinical enthusiasm prompted him to make repeated examinations of his motor and sensory functions, the patient's dawning interest in the outside world was focussed on these functions, some deficiencies in which thus became perpetuated as hysterical symptoms. A very striking example of this was a patient who happened to be the subject of intense study by a number of neurologists in the early days of the war, when the true hysterical nature of so-called "shell-shock" was not fully understood. The sensory deficiencies natural to a condition of profound stupor were consequently perpetuated after the stupor disappeared, and resulted in the most complete and widespread hysterical loss of all forms of sensation, except hearing and seeing, which I have ever observed.

Total amnesia with hysterical paralysis, contractures, analgesia, and mutism due to emotional strain; recovery of memory after 22 months and from paralysis after 28 months.—Pte. M., aged 23, with no personal or family history of neurosis, was slightly wounded in the thigh in May, 1915, after serving from the beginning of the war. He returned to the front in October, 1915. He was quite fit until Feb. 19th, 1916, when he had to be forcibly prevented from going over the parapet to attack some German mortars which were firing at his trench. He then became dazed, and on reaching the aid-post he could not answer questions, but he obeyed simple commands, such as to put out his tongue. He believed he was still in the trenches, which were being heavily shelled; his eyes were fixed on imaginary trench mortar shells coming towards him. His knee-jerks were brisk, there was an extreme degree of pseudo-ankle clonus, but the plantar reflexes were flexor. The bowels and bladder remained under control. Two days later the knees and ankles had become stiff; the legs, hands, and face were anæsthetic and analgesic. When he reached England on March 2nd his expression was apprehensive, and he started at every sound, both when awake and asleep. In his dreams he saw the ghosts of Germans he had bayoneted come to take revenge on him, and he heard them fire at him. He was still unable to speak, but he answered questions by nods and signs, and in writing. He was able to walk with assistance. He was treated by hypnotism and the hallucinations disappeared, but his physical and mental condition rapidly deteriorated.

I saw him for the first time in December, 1916, 11 months after the onset. He could not speak, and all four limbs were now completely paralysed, except that he was able, with a great effort, to make slight movements at his left elbow-joint. An extreme degree of contracture was present: the legs were rigidly extended, with the feet plantar flexed; the arms were extended, and the fingers tightly clenched, though the metacarpo-phalangeal joints were extended. It was almost impossible to produce any passive movements, but the contractures were entirely hysterical, as they relaxed completely under an anæsthetic and during sleep. Total anæsthesia and analgesia of the whole body, including the conjunctiva, cornea, and buccal mucous membrane, were present, except that passive movements at the elbow were painful, and he occasionally suffered from toothache. The anæsthesia disappeared, at any rate to some extent, during sleep. Although deep pressure over the abdomen produced no sensation, the sensibility of the bladder and rectum appeared to be present, as he retained perfect control over them. The sense of taste and the sense of smell were obviously much impaired, and the fields of vision seemed to be greatly contracted, but hearing was abnormally sensitive, and the auditory-motor reflexes were extremely brisk. The conjunctival, corneal, and all skin reflexes were absent; when the contractures relaxed under partial anæsthesia the deep reflexes were found to be normal.

On Dec. 15th, 1916, vigorous suggestion with the aid of an intralaryngeal electrode during light etherisation restored the power of whispering. It was then found that the patient had total loss of memory; he had no idea who or what he was, he did not realise that his anæsthetic legs belonged to him, and he had no knowledge of the meaning of words.

During the following months he learnt to talk a kind of pidgin English, but the meaning of every word had to be taught, and he used each word in his limited vocabulary for a variety of meanings. All liquids were "tea," and when petrol was poured into the tank of a motor-car he was in he called out "Table has tea," table being for some obscure reason the name he applied to all vehicles. "Hand" represented a hand and a glove, and "to hand" was to hit. A word taught by other patients in fun would never be given up, so that all forms of meat, chicken, and fish were called "puss." His only numbers were one and six, which represented anything more than one, except a very large number, which was sixty-six, or a still larger number which was six-sixty-six. The sight of his own face in a mirror always terrified him: he did not realise who it was he saw, and turned his head away, saying, "No like you, chick." On seeing in the mirror the face of the sister who was standing by his side, he was greatly amused and said "See six sisters." All attempts to teach ideas of time, space, and colour failed, and he did not recognise any of his relations, even when his father was brought to him in the middle of the night in the hope that he might know him at the moment of waking. He remembered recent events and called people by names which he invented himself; a bald patient was "no-hair chick," and men who limped badly were "no-leg chick" and "six-leg chick"; all officers in uniform were "Major," and civilians "Mister," or, if friends, "Mister Chick."

In spite of treatment no improvement in the condition of his limbs had occurred by October, 1917, though he was able to sit up in a chair and enjoyed being taken out of doors. He delighted in childish toys, and in a general way his mind was that of a year-old child. He was quite happy, but he was becoming very emaciated; it was difficult to persuade him to eat, as he had completely lost the senses of taste and smell, and he apparently never felt hungry.

On Nov. 22nd, 1917, for no obvious reason, he had a headache and became excited in the evening. His memory began to return during the night and he talked incessantly. The next day he

realised the deficiencies in his speech and wished to have them corrected. When told a word he repeated it correctly and remembered it, and he began to form proper sentences. On Nov. 24th I cured a man suffering from hysterical aphonia with a laryngeal sound in his presence. Though this had failed on many occasions since he learnt to whisper nearly a year before, it now cured him instantaneously to his intense delight. He felt something snap in his head, and immediately afterwards he talked quite normally and the memory of his home and his past life flowed back. His father came the next day and he knew him at once. He soon remembered his experiences in France, but his life in hospital for 21 months was a blank, as it seemed to him that he was in France only a few days ago. He had a vague recollection of very recent events and he knew the men in the ward, but did not remember friends who had gone out only a week before. He remembered "feeling funny with a buzzing head," then "something in his head was suddenly relieved," and the buzzing stopped when his memory returned.

Complete anæsthesia and analgesia were still present, and the cutaneous, conjunctival, and corneal reflexes were absent. With his eyes bandaged the only difference he could recognise between hot and cold water, tea and beer was that the tea was "sweet" and the beer was "bitter." Salt was recognised as a powder, but without taste. Jelly was recognised, as it dissolved so quickly in the mouth, but butter was also taken to be jelly. Bread was indistinguishable from fish, and he could not recognise any difference whether it was spread with butter, mustard, or salt. Marmalade appeared sweet, but was not recognised; he guessed that chutney was apple.

His mental condition was now perfectly normal, but for some time very little improvement occurred in the condition of his limbs. With re-education the left arm slowly improved, but it was not until he was transferred to the Seale Hayne Hospital in April, 1918, that any marked change occurred. At the end of a fortnight his right arm, which had hitherto remained rigid and paralysed, had improved so much that he could write long letters, brush his hair, and feed himself, but all movements were stiff, shaky, and slow. The left arm improved at the same time, but there was still no recovery of voluntary power in the legs. On May 1st a renewed attempt was made to overcome the rigidity of his legs. This was so far successful that slight voluntary power returned in the feet. Steady improvement followed until all movements became possible, the adductor spasm of the thighs being the last to relax. By May 31st he could stand with very little assistance and could perform all ordinary movements with his arms, though some rigidity was still present. On June 2nd, his twenty-fifth birthday, he stood without support, and after being helped for a few minutes he walked without assistance round the quadrangle after having been paraplegic for 28 months. His physical condition now steadily improved, and by June 20th he was able to take charge of the basket-making shop. The sensibility of his skin and mucous membrane slowly returned without special treatment, but was still somewhat deficient in August. The superficial reflexes returned pari passu. Thus, the abdominal reflexes were absent so long as anæsthesia was complete. When at length a strong faradic stimulation could just be felt on the left side, a weak reflex appeared on this side. The right reflex only returned at a later date when the right side of the abdomen was no longer completely anæsthetic, but it was still weaker than the left, corresponding with the fact that sensibility was more nearly normal on the left than on the right side. In the same way the corneal and conjunctival reflexes returned with the return of the sensibility of the cornea and conjunctiva.

By September, 1918, recovery was complete. The last trace of contracture of the fingers and of unsteadiness in gait had disappeared. The patient had regained his weight and was in every way as fit as when he first joined the army. Since then he has remained perfectly well.

(3) *Hysterical Anæsthesia Following the Anæsthesia Caused by Injury to Peripheral Nerves.*

The paralysis and anæsthesia following an injury to a peripheral nerve, which is caused by the interruption in the nervous impulses passing between the central nervous system and the periphery, may both be perpetuated as hysterical symptoms when the interruption is no longer present.

A gunshot wound in the immediate neighbourhood of a nerve produces minute changes in its structure which quickly disappear, but, evanescent as these concussion changes are, they are none the less organic, and the paralysis and anæsthesia they produce are primarily of organic origin. The patient may at first make repeated attempts to contract the muscles supplied by the nerve, but, as he invariably fails, he finally discontinues and realises that the muscles are paralysed. If the true nature of the condition is recognised and the patient is encouraged to repeat his attempts every day, he will find in a very short time that his power is returning. If, on the other hand, the condition is misunderstood, and the patient is ordered treatment with electricity and massage, and is given to understand that he may have to continue with this treatment for weeks or months before recovery can take place, the original tendency to perpetuate the incapacity by auto-suggestion is greatly strengthened by the hetero-suggestion involved in the treatment, with the result that by the time the nerve has completely recovered the organic incapacity is replaced by an exactly similar hysterical incapacity. In the same way the primary organic anæsthesia is perpetuated as hysterical anæsthesia with all its characteristics unaltered, particularly if the patient's attention has been drawn to its extent and its exact nature by the thorough investigations of a keen and interested medical officer in the early stages when the condition was still organic. If the nerve is more seriously damaged, especially if it has been divided and subsequently sutured, the primary organic condition lasts for a longer period, and its characteristics are all the more likely to become vividly stamped on the patient's mind and to become perpetuated as hysterical phenomena when recovery from the actual injury at last occurs.

I am convinced that the voluntary power of paralysed muscles returns before the response to faradism when an injured or divided and sutured nerve is regenerating, an opinion which is shared by most observers. When complete paralysis has been present for many weeks it is natural that a man should cease to make an effort to move the affected part, so that it is extremely likely that he will not become aware of his returning power at the first moment that the regenerating nerve is capable of conveying motor impulses. If left to himself he will probably only make the discovery some weeks later, when a considerable degree of power has returned, and the normal electrical reactions are re-established. If he is receiving regular electrical treatment, the discovery of a response to faradism is likely to prompt the operator to tell him to make an effort to move, which will in all probability be successful owing to the suggestive effect of the ocular demonstration of the movement produced by the electricity. Under more favourable conditions the patient is seen frequently by the physician, who encourages him to make daily efforts to contract the paralysed muscles, with the result that the returning power is recognised at an early stage—frequently before there is any response to faradism. I believe that the exceptionally early recovery of function after nerve suture, which is occasionally observed, is due to the patient having discovered that he can contract the paralysed muscles within the first few days after the nerve has regenerated sufficiently for a few feeble impulses to be conveyed along it.

If from the beginning no attention is paid to the anæsthesia, it disappears spontaneously when the motor symptoms are cured. If, however, it has been carefully investigated, and its extent and nature have become thoroughly recognised by the patient, it is likely to persist as hysterical anæsthesia. It can then be cured almost instantaneously by the suggestive effect of the application of a faradic current, the patient being first told that his sensation will at once return when the electricity is applied. He quickly feels the electricity, and directly afterwards it is demonstrated to him that he can now also feel the lightest touch as well as pain, and can distinguish accurately between hot and cold. This immediate recovery with suggestion proves that the condition must be genuinely hysterical.

The exact area involved when the condition is no longer organic depends largely upon the intelligence of the patient and the interest he takes in the examination of his anæsthesia, and partly on the physiological and anatomical knowledge of the observer, who would be likely to influence the patient by his own ideas on the subject, both whilst the condition was organic and after it became hysterical, unless he was unusually expert in avoiding the liability to suggest what he expected to find. The following case is selected from several we observed in which hysterical anæsthesia showed a distribution exactly similar to that produced by an organic injury to a peripheral nerve.

Hysterical anæsthesia of the median nerve following a wound of the forearm.—Pte. B., aged 36, was wounded in the right forearm on Sept. 5th, 1918. His hand became paralysed and there was anæsthesia in the area of skin supplied by the median nerve. After being treated by massage for three months he was admitted to Seale Hayne Hospital under Captain S. H. Wilkinson on Jan. 20th, 1919. Hysterical contracture of his fingers prevented him from flexing them, and he complained of numbness of the thumb and the first two and a half fingers. (Fig. 7.) He was treated by percussion and re-education, and at the end of two days the motor power of his hand was normal. Sensation was then restored in a few minutes by suggestion with the aid of faradism.

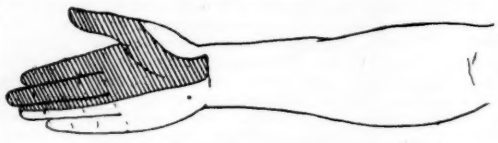

FIG. 7.—Hysterical anæsthesia in median nerve area.

Direct treatment of hysterical anæsthesia following a nerve injury is, however, often unnecessary, even if the patient is well aware of its existence, as it is sufficient to point out to him, as in the following case, that as soon as his power of movement returns the loss of sensation will disappear.

Spontaneous disappearance of hysterical anæsthesia of the ulnar nerve on recovery from associated paralysis.—Pte. B. was wounded in the upper arm on August 29th, 1918. He developed a contracture

of the ring and little fingers, and cutaneous anæsthesia of the area of the skin supplied by the ulnar nerve. He was transferred to Seale Hayne Hospital under Major J. F. Venables on Nov. 10th, 1918, with the ring and little fingers firmly flexed into the palm of the hand and with cutaneous anæsthesia in the area supplied by the ulnar nerve. The paralysis and contracture were treated by persuasion and re-education, and it was explained to him that as soon as he could move his fingers normally the numbness would go. In half an hour he was completely cured, the anæsthesia as well as the contracture having disappeared without any direct treatment by faradism or other form of suggestion.

In the following case the anæsthesia, though hysterical, was so profound that the patient injured himself without being aware of it at the time.

Hysterical anæsthesia of the median nerve, resulting in accidental injuries to the anæsthetic area.—Pte. I., aged 19, was wounded on Oct. 11th, 1918, in the left forearm. His arm and hand were put on a splint and he was transferred to England a week later. On Oct. 20th he tried to use a fork for the first time, and discovered that he could not feel it. He told his medical officer, who found that he had anæsthesia in the area supplied by the median nerve. He was transferred to Seale Hayne Hospital under Captain Wilkinson on Feb. 22nd, 1919, suffering from hysterical paralysis and contracture of the fingers, which were fixed in a semi-flexed position. The margin of the outside of the nail of the middle finger was ulcerated over an area the size of a shilling, and on the extensor aspect of the first finger there was another superficial ulcer. He stated that two days previously he had tried to get the feeling back in his fingers and thumb by holding them in front of the fire. He had been unable to do so, and had not been aware that he had burnt himself until the following morning, when he found large blisters had developed on his fingers.

On the morning of admission his hand was treated by persuasion and re-education, and at the end of half an hour he could open and close it quite strongly in a normal manner. The anæsthesia was treated by suggestion with the aid of faradism, and in a few minutes his cutaneous sensibility was completely restored. He had no further trouble with his hand, the ulcers rapidly healing, and a fortnight later he was discharged.

(4) *Hysterical Anæsthesia Following Cerebral and Spinal Lesions.*

The anæsthesia associated with the paralysis caused by disease or injury of the brain and spinal cord may be perpetuated as an hysterical symptom after partial or complete recovery from the organic lesion, in the same way as the anæsthesia associated with the paralysis caused by injury to peripheral nerves.

I have not, however, made many accurate observations on this subject, except in cases of spinal concussion in which total paraplegia followed a blow on the back. In such cases signs of organic paraplegia were often present at first, and anæsthesia was frequently discovered up to the level of the spinal segment which was principally involved in the injury. Both paralysis and anæsthesia sometimes persisted for months or even years after the organic lesion had so far recovered that it could no longer be responsible for any disturbances in the spinal functions. The paraplegia was almost always amenable to the rapid form of psychotherapy, in which explanation, persuasion, and re-education resulted in more or less complete recovery in the course of a single treatment lasting perhaps an hour. If no attention was paid to the accompanying anæsthesia at the time, it would always be found to have disappeared with the paralysis when a careful examination was made on some subsequent occasion. If, however, the sensory functions were investigated during the treatment they would be likely to persist and require further psychotherapy before they finally disappeared. A patient recovering from paralysis, which was the only symptom in which he was really interested, as it was the sole cause of his incapacity, would subconsciously expect any associated, but to him unimportant symptom, such as anæsthesia, to disappear when the paralysis disappeared, but if his attention was directed to his anæsthesia immediately before or during the treatment he might very well expect that a symptom which so greatly interested his physician would require separate treatment, and he would not recover spontaneously.

(5) *Hysterical Anæsthesia Following the Anæsthesia Caused by Peripheral Anæmia.*

Whenever the hands or feet of healthy individuals get abnormally cold, the anæmia resulting from the contraction of the peripheral vessels is accompanied by a feeling of numbness and diminution in the acuteness of cutaneous sensibility.

Individuals with a feeble circulation are particularly apt to get numb extremities in cold weather, and in Raynaud's disease a similar but much more severe anæmia with a greater deficiency of cutaneous sensibility occurs as a result of vaso-motor spasm, even when the weather is not unusually cold. A man with a poor circulation knows by experience that the best means for preventing attacks of peripheral anæmia is exercise, and that when his hands are becoming abnormally cold and numb, active movements may restore the circulation and cause the numbness to disappear.

It is natural that the immobility caused by paralysis or contracture of a limb, whether the latter is organic or hysterical, should result in deficient circulation, accompanied by numbness and anæsthesia. As the deficient circulation is continuous instead of intermittent, as in the physiological conditions already referred to, the anæsthesia becomes more profound, especially in individuals who have a feeble circulation. The anæsthesia may be so severe that the patient may burn himself without being aware of it, as in the case described below. When the circulation is temporarily improved by immersing the limb in hot water normal cutaneous sensibility returns, and in hysterical cases the improved circulation, which results from the recovery of mobility and disappearance of spasm under psychotherapy, is immediately followed by a return of normal cutaneous sensibility, even if the condition has persisted for months or as long as two or three years.

If, however, much attention has been paid to the anæsthesia which results from the poor circulation in hysterical paralysis and contracture, and its exact extent has been carefully mapped out on several occasions, the symptom takes such a prominent place in the patient's mind, instead of being one of which he is hardly aware, that it is very liable to be perpetuated by auto-suggestion when recovery from the paralysis and contracture takes place. The patient does not associate the anæsthesia with the diminished circulation, but regards it as an independent symptom, which will require separate treatment by re-education or suggestion after the paralysis and contracture have been dealt with. That the anæsthesia is purely hysterical when it persists after recovery from the paralysis is proved by its immediate disappearance with psychotherapy, although this has no effect so long as the paralysis is still present, as the anæsthesia is then a direct result of the peripheral anæmia, and is incapable of amelioration so long as the latter persists.

Hysterical anæsthesia following the anæsthesia caused by peripheral anæmia associated with hysterical paralysis of the hand.—Sergt. H., aged 23, underwent an operation on Jan. 18th, 1918, for the removal of a ganglion from the dorsum of his left hand. He was discharged to duty six weeks later, but two days after returning to work the hand became blue and swollen, and he was re-admitted to hospital. The swelling was lanced, a quantity of pus evacuated, and a splint and fomentations were applied. The wound had healed four weeks later, but the splint was kept on another fortnight. The patient then found that he could not move his fingers and that his whole arm was flaccid and useless. He was sent to the electrical department, and a few days later, while smoking a cigarette and holding it carelessly in his right hand, he brought the burning end close to his left hand. A comrade told him to be careful, but not before he had burnt his finger and caused a blister to appear. He felt no pain from the burn nor from the blister, and this was the first time that it had occurred to him that his hand was anæsthetic. He called the doctor's attention to it. The arm was examined and found to be somewhat wasted, but the anæsthesia was not investigated. A month later the patient was transferred to another hospital, and here the anæsthesia was tested for the first time and was found to extend as far upwards as the neck.

On admission to Seale Hayne Hospital under Captain W. R. Reynell on May 19th, 1918, complete flaccid monoplegia of the left arm was present, and the hand was blue, cold, and œdematous. Complete anæsthesia and analgesia were present over an area similar to that shown in Fig. 5. Treatment by explanation followed by vigorous persuasion and re-education was sufficient to restore the power of the muscles of the shoulder and upper arm in about ten minutes, but there still remained a very slight degree of wrist-drop, and the fingers and thumb could not be moved. After a second treatment lasting about half an hour the power of the fingers was so far restored that the grip on the dynamometer registered 110, and the blueness and swelling had completely disappeared. Two days later the grip was 140, and the patient took part in boxing practice. A fortnight after admission the grip was 180, which is above normal for the left hand, the grip with the right hand being 240. The anæsthesia, which had not altered in degree or extent, was now treated by direct suggestion with the aid of faradism; normal sensibility of the whole arm was restored in a few minutes.

It is clear that in this case the primary anæsthesia which led to the accidental burn was not hysterical. It was caused by the peripheral anæmia, with which the disuse resulting from the hysterical paralysis was associated. When the extent of the anæsthesia was investigated the examination resulted in its spread by hetero-suggestion, a large hysterical element being now present, as the peripheral anæmia could only account for anæsthesia of the hand and possibly of the forearm. The restoration of the circulation which followed the cure of the paralysis must have caused the anæsthesia due to the peripheral anæmia to disappear, but as most of the anæsthesia was already hysterical, this part also became perpetuated by auto-suggestion when the original cause was no longer operative. Consequently the whole of the anæsthesia was ultimately hysterical, and, being hysterical, was capable of being cured by psychotherapy.

In the rare cases in which the anæsthesia associated with hysterical paralysis and contracture appears to develop spontaneously in the absence of any medical examination, it is probably in the first instance due, as in the case just described, to the associated peripheral anæmia. It is thus not primarily hysterical, being only hysterical if it persists after recovery from the paralysis and contracture.

Diagnostic Significance
OF
NERVE SYMPTOMS IN ACUTE INFECTIONS.

Being the Harveian Society's Oration.

BY SIR THOMAS HORDER, M.D. LOND.,
PHYSICIAN WITH CHARGE OF OUT-PATIENTS TO ST. BARTHOLOMEW'S HOSPITAL.

MR. PRESIDENT AND GENTLEMEN,—I have chosen a subject for my address this evening which is topical because the first considerable outbreak of cerebro-spinal fever occurring in Great Britain in modern times has been followed more recently still by two large waves of epidemic influenza, overlapping more or less with an epidemic of encephalitis. These events have provided ample material both for investigation and forethought. And now a fair number of sporadic cases of all three of these diseases gives us opportunities for application of the lessons we may have learned and for revision of these lessons in so far as they have been too hasty by vice of the limited time at our disposal during the stressful period of the war. A difficult subject because I am anxious to give you, not merely a digest of other people's opinions, so much as a tentative presentation of my own experiences.

I. INTRODUCTORY.

The problem so frequently facing us, of a patient taken suddenly or acutely ill with a disease whose symptom-complex contains elements of a nervous kind, whether subjective or objective, and demanding careful investigation, is so familiar that I will not stay to dilate upon its importance. This problem forms the practical basis of my remarks this evening. It is not a problem essentially for the bacteriologist, though his help may be, and ofttimes is, invaluable. It is not a problem essentially for the neurologist, though his researches and his teaching are of great assistance in the diagnostic argument which arises from a study of the case. It is essentially a problem for the practitioner. Not only the patient and the patient's friends, but the bacteriologist and the neurologist also, wait upon him in such a case. In spirit and in outlook, and in the first instance, he must *be* the bacteriologist and the neurologist, though not necessarily in laboratory experience nor in technical knowledge. It is the practitioner who makes the first approach and who has the onus of attempting the first diagnosis. Few cases, if any, try his resources more thoroughly than patients of this class, and yet few cases reward him more for careful and methodical study. I can only hope to indicate this evening the bare lines upon which, as it seems to me, his thoughts may usefully travel when faced with the clinical material of actual practice.

I shall deal with the subject from two points of view: (1) the general or synthetical aspect; and (2) the particular or analytical aspect. Under the first heading I shall consider briefly what are the mechanisms, physiological and histological, by which nerve symptoms in acute infections are produced; under the second heading I shall consider these symptoms themselves and touch upon their diagnostic significance.

II. THE MECHANISM OF PRODUCTION OF NERVE SYMPTOMS IN ACUTE INFECTIONS.

Disease may be defined as the sum of the phenomena resulting from the interaction between the organism and various pathogenetic influences. The "acute infections" are diseases resulting from the interaction between the organism and pathogenetic microbes whose virulence is sufficient to cause rapid disturbance of normal functions in tissues which offer some degree of resistance to the attack. Prominent amongst these disturbed functions in many acute infections are those directly referable to the nervous system. The resultant of these nerve disturbances are what we term nerve symptoms and nerve signs. The mechanism by which disturbance of nerve functions is produced is not the same in all cases, and in order to get clear conceptions of the pathogenesis of nerve symptoms it is necessary to determine and to distinguish these mechanisms carefully, and to consider which one is present, or whether more than one, in each individual case presented to us.

When a pathogenetic micro-organism assists in causing an acute illness the complete sequence of possible events in respect of its activity includes a focus of invasion, a focus of primary infection, a state of general intoxication, a state of general infection, and a focus of secondary infection. Foci of secondary infection may further intensify the condition of general intoxication and of general infection. In a few diseases all of these processes may occur in fairly orderly and recognisable sequence. They may all of them be seen, for example, in some cases of streptococcus infection. The streptococcus invades the tonsil, a focus of infection arises here (acute tonsillitis), toxæmia results, septicæmia results, a secondary focus of infection takes place in the heart (acute endocarditis) and, finally, the streptococcus reinfects the blood stream from this secondary focus, intensifying the general intoxication. In those acute infections which we term "acute specific diseases" it is common to find a selected series of these possible processes brought into play, and the particular series is apt to be repeated again and again by particular microbes, leading to established disease pictures which are recognisable as such. In other words, diseases caused by certain infecting agents for the most part "breed true," and yield results which justify the use of the term "specific." But not always. There are imperfect instances in disease as there are in any other type of objects. For the most part, again, the "course" of acute specific infections is closely repeated in the majority of instances of the infection, so that the cases compare more or less closely at given stages of the disease process. But, again, not always. There are "immature" and there are "precocious" specimens; there are "gigantism" and "dwarfism"; there is even "progeria" or premature senility. But for simplicity we will confine ourselves to disease-types, and we will omit anomalies.

With these ideas before us, let us glance at a few diseases which exhibit marked nerve symptoms. In *diphtheria* the usual series of events includes a focus of invasion in the fauces, a primary infection at the site of invasion, and a state of general intoxication. In *pneumonia* the series includes an (obscure) invasion focus somewhere in the respiratory tract, a general infection with little or no focal infection, a rapid secondary infection in the lung tissue, and resulting general intoxication. In *cerebro-spinal fever* there is an invasion focus in the naso-pharynx but little or no infection here; invasion of the blood stream but rarely an infection of it; a primary infection in the pia-arachnoid membrane; and a state of general intoxication resulting from this systematised infection. (If it be true, as some authorities consider, that the passage of the microbe usually takes place directly through the lymphatics between the naso-pharynx and the base of the brain rather than through the blood stream, this does but extend the site of invasion; it does not introduce a different conception of the main series of events.) In *poliomyelitis* we postulate an invasion focus in the upper respiratory tract, an invasion of the blood stream, or, again, of the channels between this area and the central nerve-axis, a primary infection of the substance of the brain and cord, and a general intoxication from these tissues.

If these conceptions are justified, as I think they are with our present knowledge, it follows that nerve symptoms arising as part of the interaction already referred to are directly referable to one or more of three different processes by which the nervous system becomes implicated. These three mechanisms by which nerve symptoms are produced are—

1. *By toxæmia.*—Nerve tissues are affected by circulating toxins derived either from a focus of primary or of secondary infection or from a general blood infection. In this mechanism there is no actual involvement of the meninges or of the nerve tissues themselves.

2. *By infection of the meninges.*—As the result of primary or secondary infection inflammatory changes occur in these times and lead to one or more of three morbid pathological processes, either of which may produce nerve symptoms: (*a*) mere toxæmia resulting from the interaction in the inflamed membrane; (*b*) irritation and strangling of nerve-roots by the inflammatory products in the pia arachnoid; (*c*) the accumulation of cerebro-spinal fluid in the cerebral ventricles and in the cisternæ of the spinal cord whereby hydrocephalus and hydromyelia may result.

3. *By infection of the nerve tissues themselves.*—Inflammation takes place in the brain and cord, leading again to three different morbid changes, each capable of contributing its own quota of nerve symptoms: (*a*) changes occurring directly in the blood-vessels, such as thromboses and hæmorrhages; (*b*) inflammation and degeneration of the grey matter, and especially of the nuclei, resulting from the infiltrating vascular lesion; (*c*) secondary changes in the conducting nerve paths.

In the first of these three mechanisms the nerve symptoms manifested by the patient are chiefly "functional" in origin; in the second and in the third of these mechanisms the symptoms are chiefly "organic" in origin. The great significance of these mechanisms lies in this distinction.

Now the virus of each of the acute specific infections tends to set in action all three of these mechanisms, but the degree of this tendency varies with the particular virus. This is a fundamental conception taught by recent research in clinical medicine, in clinical pathology, in bacteriology, and in morbid anatomy. It is only by the combined study of all these methods of observation that we can learn to appreciate the total results of infection. *The selective affinities of "specific" micro-organisms are not absolute qualities of these agents, but only relative tendencies.* And they must be regarded as such during our deliberations as to what particular interaction is taking place in the patient and as to what particular microbe is giving rise to the disease.

A very pertinent illustration of the truth of the statement that microbic agents tend eventually to set going all three, and not merely one, of the three mechanisms by which nerve symptoms are produced, is afforded by fuller study of the cerebro-spinal fluid in disease, rendered possible by the more frequent performance of lumbar puncture in acute infections. It is found that changes in this fluid are much more common in the course of acute infections than was formerly supposed to be the case. Intermediate between mere toxæmia and actual meningitis we now recognise a state of things to which provisionally we give the term *meningism* or *meningismus*, a condition in which the correlative of intense nerve symptoms is found to be an absolute increase in the amount of the fluid, its existence under increased pressure, a slight increase in its protein content, and a slight increase in its cell content. These symptoms include headache, vomiting, delirium, convulsions, rigidities, and even coma. The condition is not very uncommon in pneumococcus infections in children, in measles, in acute streptococcus infections, and in some others. The symptoms are ofttimes considerably relieved, it may be wholly cured, by the drainage of the fluid incident to the puncture.

Another pertinent illustration of this same truth is yielded by recent experiences of poliomyelitis. Not a few cases of this disease give clinical evidence of involvement of the meninges as well as of the vessels of the underlying nerve substance. Rigidities may occur, and the clinical picture may resemble cerebro-spinal fever very closely indeed. So much so that these cases have been grouped under the term "the meningitic type" of poliomyelitis. In such cases examination of the cerebro-spinal fluid reveals changes that are intermediate between those found in meningism and those found in cerebro-spinal fever. In such cases there is post-mortem evidence for regarding the lesion as a meningo-encephalitis, and not as a mere encephalitis only. In the third place I may bring to your remembrance the old-established observation that the disease we term for convenience "tuberculous menigitis" has as its pathologico-anatomical basis in most instances considerable inflammation of the brain substance in addition to the characteristic involvement of the meninges, that it is, indeed, a meningo-encephalitis, a fact which explains the depth to which the brain functions suffer throughout the whole course of this fatal disease in the majority of the cases.

Making due allowance, as we certainly must, for this tendency of every microbic virus to set up nerve disturbances by all three of the processes described, we are yet able in a large number of instances of infection, and by a close study of the symptoms themselves, to predict the probable nature of the microbe concerned. And, inversely, given the identification of the microbe concerned, we are often able to predict the probable mechanism by which nerve symptoms will arise.

The mechanism of toxæmia is the one operative in *diphtheria* and *tetanus* in the great majority of cases. It is also that by which nerve symptoms arise in most cases of *pneumonia*, *typhoid fever*, *scarlet fever*, and *rheumatic fever*. Secondary infection of the meninges occurs not infrequently in *pneumococcus infection* and is relatively more common when the primary infection occurs in the middle ear. In *measles* the nerve symptoms are usually toxæmic, but the specific virus, though it causes meningism not infrequently, rarely causes a true meningitis. That it occasionally sets up an encephalitis or a myelitis, however, has been long recognised. In *mumps* an actual inflammation of the central nerve structures sometimes occurs, and recent experimental work suggests strongly that the virus in this disease has group affinities with the causative virus of poliomyelitis (M. H. Gordon). It is possible that the virus of *infantile cholera* has similar affinities.

Reference has been made already to the tendency in *generalised tuberculosis* for the mechanism of encephalitic as well as meningitic involvement to be added to that of a toxæmia. In *cerebro-spinal fever* the meningococcus attacks the pia arachnoid in primary fashion, and this is by far the chief mechanism of production of the long series of symptoms presented in the disease. In some of the more severe and prolonged cases, however, there is inflammation of the underlying nerve tissue, both cerebral and spinal, witness the not uncommon ependymal lesions seen post mortem, and the histological changes demonstrable in the cortex. In *poliomyelitis* and in *encephalitis*, be the virus identical or only possessed of group affinity, the primary infection is the central nervous system itself, through intimate vascular infiltration. The mechanism of production of the symptoms in these diseases involving structural changes in the master tissue, it is not surprising that the symptoms are profound and of extremely serious import.

The nerve symptoms present in *influenza*, though protean in nature, are probably due in the main to a toxæmia, which may be of any degree from mild to intense; meningism is not uncommon; meningitis is rarely present in my experience, since I do not regard those sporadic cases of meningitis in which Pfeiffer's bacillus is isolated from the cerebro-spinal fluid as having any necessary association with influenza; encephalitis undoubtedly occurs in some of the fulminating cases during an influenza epidemic.

III. The Significance of Particular Nerve Symptoms in Acute Infections.

Passing now to particular nerve symptoms, I propose to review briefly those commonly met with during the examination of patients suffering from acute infections and to offer certain considerations bearing upon their diagnostic significance.

(i.) *Facies, posture, and temperamental state.*—It is scarcely possible to note these points too carefully or to analyse them too closely. It is here, perhaps, more than anywhere, that the eye of the experienced practitioner is of invaluable service. Too often this series of observations is wholly overlooked, or only considered when some rather glaring feature strikes the doctor's attention, whereas it should be made a matter of routine practice, just as are the pulse, the tongue, and the temperature. In some cases the picture is so

clearly outlined that its significance cannot escape notice. The picture of excruciating pain shown in all its intensity by features which are contorted by the spasm of tetanus reveals quite clearly the nature of this infection. The child curled up beneath the bedclothes, peevishly shaking off the nurse who comes to tend it, or suddenly crying out in the stillness, or picking its lips and teeth with monotonous persistence: the question of tuberculous meningitis comes at once to the mind. The apathetic listless facies of the typhoid patient, lying low in bed, with tremulous hands, muttering, but with no visible signs of distress, is almost as decisive. The young man lying on his side, a bluish flush upon his face, his head thrown slightly back and limbs drawn up, staring for hours before him, resenting interference—such a picture takes us a long way towards a diagnosis of cerebro-spinal fever. And, of late years, the "mask-like immobile facies, with half-open eyes, the patient not so much in real sleep as sleep is indicated to the observer by the expression of the patient," add possibly a ptosis or a squint, and we are familiar with the picture as highly suggestive of encephalitis.

These are, however, as I have said, easily recognisable clinical pictures, because they are drawn with definiteness and with precision. We must train ourselves to the dimmer outlines, to the impressionist substitution for the completed work of art. But these lesser degrees of facial, postural, and temperamental change baffle description; they must be seen to be identified.

(ii.) *Headache.*—This is the commonest of all the individual nerve symptoms with which we are here concerned; and it is probably the least specific in diagnostic value. So constant a symptom is it in nearly all acute infections that to many it may seem almost valueless for differential purposes. And yet a critical analysis of its features is called for in every case, for it is only by giving the symptom this degree of attention that we obtain a hint of the mode of its production and the nature of the infecting agent. It is necessary to consider the headache in its intensity, its distribution, its persistence, its synchronism with other nerve symptoms, especially with delirium, its course, and the effect upon it of palliative remedies. In the matter of intensity there is little doubt that the headache of meningitis may be the most severe with which we have to deal. Approaching it most nearly is the headache of high grades of toxæmia, especially of typhus, typhoid, and influenza. In encephalitis the headache is rarely so severe as in meningitis. Steady persistence of the headache at the same level of intensity is also suggestive of meningitis; so, too, is the continuance of the headache as the course of the disease progresses. In influenza the headache rarely maintains the level of its early intensity past the third or fourth day; in typhoid it usually disappears completely or moderates very considerably with the onset of the "typhoid state." In most acute toxæmic states it may be said generally that the intensity of the pain is greater during the onset and early stage of the disease than later. As to distribution, in meningitis there is sometimes a marked concentration of the headache in the occipital region, but when this is so the rest of the head does not usually escape. In influenza the post-orbital and frontal regions are frequently complained of bitterly, other regions often suffering little or not at all. In typhoid the headache is sometimes an intense hemicrania.

Synchronism of headache with delirium has been a valuable diagnostic observation ever since Jenner pointed out the fact that such synchronism almost invariably indicates organic brain disease. Children often show this synchronism by uttering a painful cry, and adults by obvious delirium concerning their headache. In toxæmias, on the other hand—in typhoid and influenza notably—the headache departs with the onset of delirium. It is a common experience to see the typhoid patient racked by headache during the day and muttering quietly and more or less peacefully during the night.

Remedies, whether by local applications or by drugs given internally—unless opiates be administered to the point of physiological doses—usually fail to relieve the headache of meningitis, but they very often ameliorate the pain in toxæmias.

(iii.) *Neuralgias* are more common, in my experience, at the onset and during the first two or three days of some acute infections than is to be inferred from text-book literature. I have been struck by the frequency of their occurrence in encephalitis and poliomyelitis particularly. The nerves affected have most often been one or other branch of the trigeminal or the great occipital. The pain may be exceedingly severe, so as wholly to dominate the clinical picture. These focal pains may precede the headache by some hours. Similar intense neuralgias occur in cerebro-spinal fever also during the early stage. But since influenza and typhoid share this tendency to intense neuralgic pains, though in less degree, care must be exercised not to deduce from them the presence of an organic disease of the nervous system. The point of great practical importance is to remember that their presence may indicate the early stage of a general infection of considerable severity, and therefore help the observer to further examination from this point of view.

(iv.) *Vomiting*, if it occurs at the very commencement of an acute infection, has little or no special significance; it is common to the great majority of fevers—though more common in some than in others—and indicates, with a rigor or a convulsion, with the initial headache and with the malaise, the general invasion of the body by the virus. Vomiting that is repeated after the first day, however, or vomiting which appears after the second day or so, not having occurred at the period of general invasion, has definite differential value, raising the question of organic brain disease, especially meningitis. If the vomiting recurs day after day, the diagnostic value of the symptom is enhanced. There two acute infections in which vomiting of this character has not such special significance. One of these is diphtheria, in which the mechanism of its production has been thought to be a vagus neuritis; the other is severe influenza. In both of these conditions, but especially in the former, the symptom is a bad prognostic.

(v.) *Delirium.*—The features of a delirium should be investigated as critically as those of a headache. Before judging of the significance of delirium in any patient it is well to inquire carefully into the past history and also into the family history. As some persons tend easily to headache, and others are almost immune, so is it with delirium. Delirium may replace headache altogether in patients whose family history includes a psychopathic strain. I have seen such a person become suddenly delirious with the onset of typhoid fever of quite ordinary severity, and entirely miss the least suggestion of headache. Little children, of course, do not suffer from delirium in the true sense of this word, because their minds are not sufficiently developed to make delirium possible. The significance of synchronism and alternation respectively, of delirium and headache, has been referred to already. The period in the disease at which the delirium develops is an important differential point. In typhoid delirium rarely occurs before the tenth day, whereas in meningitis, even in cases of moderate intensity, it may be present from the first. So also in encephalitis. There is an important point of distinction between typhoid and meningitis on the one hand, and pneumonia and influenza on the other; that in the former two diseases there is little necessary relation to be observed between the delirium and the severity of the disease, and in the latter two diseases this relation is usually well marked. As to the character of the delirium, it is generally of a quiet type in typhoid, and not associated with restlessness; in pneumonia and in meningitis, however, this asthenic feature is conspicuously absent. This difference is probably related to the fact that, whereas in typhoid headache and acute discomfort disappear when delirium supervenes, in meningitis the intense headache is still

persisting, and in pneumonia the respiratory distress and the dilating heart are contributing to make the delirium loud and active. A sthenic delirium in typhoid generally means either that the patient is a psychopath, or that he has a secondary meningitis, or, as has been once or twice recorded, he has lost blood profusely by intestinal hæmorrhage, leading to a maniacal state from cerebral ischæmia.

(vi.) *Coma and allied states.*—Coma has always been regarded as a worse prognostic than delirium, and this opinion is borne out by the knowledge that in an acute infection coma is much more suggestive of involvement of the meninges or of the brain tissue than is delirium. Deep coma, from which the patient cannot be roused, is very likely indeed to indicate a meningitis. An appearance of sleep—*lethargy*—from which it is possible to rouse the patient for the purpose of examination and questions, the while he tends to fall back again into a state of apparent somnolence, we have learned to associate with inflammation of the brain substance; it is the feature which has led to the name *encephalitis lethargica* for those cases occurring recently in epidemic form in this country, in America, in France, and elsewhere. Whether these cases have been due to the virus of poliomyelitis or to some closely allied virus is still a matter of investigation. A state of *stupor*, which is neither coma nor lethargy, is very common in severe cases of cerebro-spinal fever and when associated with mental irritability and resistance to examination constitutes a very recognisable picture in this disease. A special kind of stupor is the condition termed *coma-vigil;* it is almost confined to cases of severe toxæmia, and especially typhus and typhoid; it indicates a very grave degree of the acute asthenia of infection.

(vii.) *Muscular hypotonus and hypertonus.*—The state of flaccidity or of rigidity which is often so conspicuous a part of the general facies requires special attention. In most toxæmic states the tendency of the musculature is towards diminished tone—typhoid, influenza, pneumonia, pyogenetic infections generally. The onset of meningism, however, as a complication in either of these infections abolishes this hypotonus. In encephalitis hypotonus is a very marked feature after the first two or three days, excepting the type of the disease termed the meningitic type. In cerebro-spinal fever the condition is the antithesis of this, hypertonus being present, and leading to those rigidities which have come to be regarded as cardinal points in the diagnosis: stiffness of the neck, with a tendency to retraction, tautness of the hamstrings giving rise to Kernig's sign, and other manifestations of the same general state.

(viii.) *Focal paralyses and pareses.*—These are perhaps the most conclusive of all nerve symptoms pointing to direct involvement of the nervous system in acute infections. When present in the early stage of such a disease they suggest strongly that the infection has already set up changes in the cerebral or spinal centres; in other words, that an encephalitis or a myelitis is present. We therefore make a special examination of the eyes for internal or for external ophthalmoplegia, and for ptosis, partial or complete. A complaint of diplopia, whether made by the patient to the doctor, or recorded by an intelligent relative, is never to be passed over lightly, for even if no strabismus is found on examination the occurrence of transient double vision is highly significant. An entirely fresh examination must be made at each visit to a patient suspected of an encephalitis, because these pareses of the eye muscles come and go, but do not thereby lose in significance. It is estimated that some form of ocular palsy, if we include ptosis in this term, occurs in over 70 per cent. of all cases of encephalitis. No doubt the greater frequency of squint in meningitis when it is due to the tubercle bacillus than when it is due to the meningococcus, is explained by the fact that the mechanism of an actual encephalitis is more often superadded in the former than in the latter infection.

Critical examination of the face, and especially of the mid-facial movements, is equally important, taking care to secure absolute symmetry of the patient's head and equal illumination on both sides during the investigation. The limbs are subjected to similar observation for evidence of weakness, both as a whole and in regard to muscle groups. A doubtful diagnosis of encephalo-myelitis may be definitely established now and again by finding polar effects emerge as the course of the disease proceeds—a weak hamstring or quadriceps group, a foot-drop or paresis of the abductor indicis or muscles of the thenar eminence in one hand.

(ix.) *Changes in the reflexes and tendon-jerks.*—These call for great discrimination, and not a little forbearance, in their interpretation. The reasons for this are two: with the exception of the knee-jerk, and perhaps also of the ankle-jerk, there is no constancy in regard to their presence in health in certain persons; on this account the criteria by which we judge the significance of the absence of the "reflexes" in disease are by no means strict; but, secondly, almost any severe toxic process may cause the reflexes to disappear, and this applies especially to the tendon-jerks. In typhoid fever, for example, and in severe pneumococcus infection, myotatic irritability may be much reduced and the knee-jerk may be unobtainable. A third factor comes into play and adds to the difficulty, and that is our inability at times, when the patient is very acutely ill, to apply the reinforcement method customary in cases of less severe illness when the knee-jerk is not obtained by the ordinary method. Two signs, however, are extremely helpful when they are present, and in both instances they are strongly suggestive of organic disease of the nerve centres or conducting paths of the cord: (1) asymmetry in the reflexes on the two sides, and (2) variations in the reflexes from day to day. I have been struck of late by the variations—vagaries, I might almost say—of the reflexes in some cases of poliomyelitis and polio-encephalitis during the stage of the disease following upon the general febrile disturbance. To-day the knee-jerks may be present, to-morrow absent, the third day exaggerated—perhaps with true ankle-clonus superadded—two days later the clonus may have gone and the knee-jerks may be difficult to obtain. The same remarks apply to the plantar response: on one day it may be flexor, upon another extensor, and then again it may revert to its normal type. And with these vagaries in the quantity and quality of the reflexes lack of symmetry may coexist, showing variations no less marked and no less rapid. I believe that these observations, if present, are highly diagnostic of encephalomyelitis.

In meningitis, for the most part, a state of hypertonus exists, owing no doubt to the irritation of the nerve roots by the inflamed pia-arachnoid and its extensions forming the sheath of these roots. It is not, therefore, surprising that in the majority of cases of cerebro-spinal fever the knee-jerks persist or become exaggerated. Owing to the fact, already observed, that in most acute toxæmic cases likely to be mistaken for cerebro-spinal fever the knee-jerk is temporarily abolished, I usually consider that their retention, still more their increase, in any doubtful case, favours the diagnosis of cerebro-spinal fever.

(x.) *Intolerance of light and sound.*—I have learned to attach very little importance to these symptoms in acute illnesses for any diagnostic value they possess. I am aware that *photophobia* is regarded as an important indication of possible meningitis by many, but I believe it to be much more an indication of the severity of a headache and of the general nerve disturbance than a feature of any distinctive significance. I was once asked to go to the country urgently to see a woman suffering from high fever, intense headache, and photophobia, and was commissioned to bring the materials for lumbar puncture because the diagnosis of meningitis was almost certain. When I arrived the patient was in a darkened room, an ice-bag had been applied to her head, the nurse was walking noiselessly in the room, and my request that the patient should open her eyes so that I might see them was met by a statement that this was not possible on account of the extreme photophobia. I passed on to an examination of the legs, and I found

the cause of the phrenitis: a very acute streptococcal infection on the dorsum of a foot, with livid red streaks of lymphangitis spreading from it. The woman had been bitten by a gnat at this spot whilst playing tennis two days before. The rapid and satisfactory response to treatment made it certain that no meningeal complication had taken place.

The more severe the headache and the more ill the patient—short, of course, of coma—the more intolerant are the senses of sight and sound. Beyond this I do not think these symptoms take us.

(xi.) *Sphincter troubles* occasionally offer a differential element of no slight import. Retention of urine may be the first symptom of acute poliomyelitis. I remember the case of a young cadet in whom it existed for a whole day and night before he felt ill enough to report himself sick; two days later he was laid up with fever and severe pains in the head, back, and limbs, and on the fourth day he had focal paralyses in both lower extremities. The occurrence of retention of urine as part of the invasion-symptoms of an acute illness should always suggest this disease. It is rare, I think, in cerebro-spinal fever at the onset, unless, of course, the case is a fulminating one and the patient is already comatose when the examination is being made. In the toxæmic states of influenza and typhoid it must be very rare.

(xii.) *Deafness* is a not infrequent symptom quite early in typhoid fever, or developing during the course of the disease. The mechanism of its production is not clearly defined, but it is probably a toxæmic effect upon the auditory centre. In cerebro-spinal fever, deafness, if it appears, is usually late, and is very apt to be a permanent sequel. It is almost certainly due to the strangling of the auditory nerve roots by plastic exudate and thickened meninges. In typhoid fever it nearly always disappears, with defervescence of the fever. In other infections, if deafness be present, it is due to infection of the middle ear, and the course of the symptom depends upon the course taken by the otitis media.

(xiii.) To these focal palsies we may add *aphasia*. Care needs to be exercised in its interpretation when present, which is but seldom, in an acute infective process. It is an old observation that it may occur in typhoid. I know of no other toxæmic state in which it occurs—the aphasia and headache of a severe megrim occasionally confuse the observer—so that its presence in a doubtful case should raise the question of tuberculous meningitis, for in adults this disease may be ushered in by aphasia. Children, it will be remembered, do not show this symptom.

I think it sufficiently obvious that the limits of clinical observation in this subject, as in others, have not been reached. It is probable that they never will be reached. The careful analysis of the symptom-complex is called for more and more on the part of all of us, and the process carries with it results of great practical value.

THE INTRAVENOUS USE OF ACETYL-AMINOPHENYL SALT OF ANTIMONY (STIBENYL) IN THE TREATMENT OF HUMAN TRYPANOSOMIASIS AND KALA-AZAR.

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IN this paper I propose to recount recent experiences with the injection of an organic compound of antimony which may in the future have an influence upon the treatment of these two protozoal diseases.

History of the Therapeutic Use of Antimony Salts.

Antimony salts were first proposed for use in trypanosomiasis by Nicolle and Mesnil[1] in 1906; the following year Plimmer and Thomson[2] noted the sterilising effect of injection of potassium and sodium antimonyl tartrates in rats experimentally infected with trypanosomes.

The intravenous injection of tartar emetic in trypanosomiasis was first successfully undertaken by Broden and Rodhain[3] on the Congo from 1906 to 1908.

In 1910 Kerandel,[4] having himself unfortunately contracted the disease, after trying atoxyl in vain, reported the successful treatment of his own case by intravenous antimony tartrate. Since that date cases at the London School of Tropical Medicine have been treated with a considerable degree of success by a combination of atoxyl given by the intramuscular and tartar emetic by the intravenous route.

The treatment of leishmaniasis by antimony salts was first attempted by Vianna and Machado[5] in 1913 in two cases of dermal leishmaniasis in Brazil. In 1914 and 1915 we find antimony tartrate being used in the visceral form of leishmaniasis, or kala-azar by di Cristina and Caronia[6] in Italy.

More recently tartar emetic has been used with success in India by Rogers,[7] Mackie,[8] Muir,[9] and by Low[10] in this country. Rogers[11] has noted that the maximum dose of this drug should be reached very gradually and should be approximately 2 gr. for an adult in a 1 per cent. solution given every third day over some two or three months.

Latterly Rogers[12] has given up using tartar emetic in favour of sodium antimonyl tartrate, finding that the latter salt can be better tolerated and given at more frequent intervals. The solutions must be made up freshly before each injection, as if kept in stock they are apt to decompose and elaborate toxic products. A considerable stimulus to the use of intravenous antimony was given by the work of Christopherson[13] upon the cure of bilharziasis by tartar emetic, both with regard to the impunity with which the drug may be pushed in that disease and the large amounts which may be given in a comparatively short period (25 to 30 gr.) within three weeks.

Objections which have Arisen in the Use of Tartar Emetic in these Protozoal Diseases.

In the treatment of kala-azar and trypanosomiasis certain objections have been founded on the intolerance which some persons exhibit towards this drug, as well as the alarming reactions which have sometimes been found to follow the use of antimony tartrate in these protozoal diseases. Rogers has recorded three deaths following its use and Low[14] has noted the large amounts —64¾ gr. over a period of four months—necessary to cause destruction of the Leishman-Donovan bodies. Daniels and Newham[15] record the successful treatment of Rhodesian trypanosomiasis, in which very large doses of tartar emetic—over 500 gr.—were injected over a period of two years, showing that the extermination of these trypanosomes by antimony in this form is a slow process, affording the parasites in the meantime ample opportunity to cause permanent damage to the brain tissues.

The symptoms attributable to the direct toxic effect of antimony tartrate upon the human body may be classified as follows:—

(*a*) *Gastro-intestinal.*—(1) Coughing and retching at time of injection, accompanied by choking sensation in pharynx. (2) Nausea and vomiting immediately after injection. (3) Delayed vomiting, commencing four to five hours after injection. (4) Acute diarrhœa lasting 24 hours.

(*b*) *Cardiac* (in trypanosomiasis). (1) Cyanosis. (2) Rapid and irregular pulse.

(*c*) *Cerebral* (especially in trypanosomiasis). (1) Loss of consciousness. (2) Incontinence of urine and fæces.

(*d*) *Arthritic* (in bilharziasis). (1) Pain in one or both shoulders commencing one to two hours after injection. (2) Acute arthritic pain prohibiting movement in all the large joints of the body accompanied by intense lumbar pain, commencing six hours after injection and lasting for the subsequent 48 hours, noted in a recent case.

The maximum individual dose of antimony tartrate I have given is one of 2½ gr. (0·16 g.).

It is evident, then, that the discovery of an organic antimony compound, bearing the same relationship as salvarsan to arsenic, less toxic to human beings, but more specific for these protozoal parasites, should be aimed at.

Favourable Results from the Acetyl Salt of Antimony.

In 1916 Caronia[16] published an account of the successful treatment of leishmaniasis in young children with a new organic compound of antimony termed acetyl-p-aminophenyl-stibiate of sodium, prepared by the chemical firm of Heyden in Dresden. The salt contained 38·5 per cent. of antimony, and was soluble (1·20) in distilled water. The maximum dosage for children under two years by the intramuscular route was 0·1 g., and in children over that age 0·15 g. The

injections were made on alternate days into each buttock—a total of 3·6 g. being given in a period of three months. In one case intramuscular abscesses following the injection were noted.

My attention was drawn to this drug by a note by Dickinson[17] in THE LANCET for Sept. 6th, 1919, and since February, 1920, a supply has been procured through the good offices of Messrs. Allen and Hanburys. Considerable improvements have now been effected in its composition, with the result that a product termed "Stibenyl" has been evolved. This latter salt contains 34·3 per cent. of antimony, is soluble in ten parts of water, contains no trace of inorganic antimony, as in the first samples procured; it is non-toxic to mice in the dose of 0·2 mgm. per kilo weight, and, as far as has been ascertained at present, is easily tolerated by man in individual doses of 0·6 g. Possibly further experience will show that still larger doses may be given to man with impunity.

Treatment of an Intractable Case of Trypanosomiasis (T. gambiense) by Stibenyl.

The history of this case, which presents many features of interest, may be summarised as follows:—

E. W. S., 35, became infected with trypanosomiasis in the Belgian Congo towards the end of 1915. His illness commenced acutely on Jan. 26th, 1916, when he became unconscious, with a temperature of 103° F. Although the patient presented all the clinical symptoms of acute trypanosomiasis, yet these parasites have been very scanty in the blood during the last four years; the last occasion on which they were found in the blood-stream was in June, 1919. The cerebro-spinal fluid has been examined and found to be negative throughout. The excellent notes by Dr. W. E. Masters which accompanied the case record a general painful cervical and axillary adenitis, deep muscular hyperæsthesia (Kerandel's sign), and a fugitive circinate rash, together with pyrexia, slight anæmia, and constant headaches. An intolerance to tartar emetic even in minimal doses was noted at an early date. Admitted to the Albert Dock Hospital on April 4th, 1917, he has been under observation there up to the present moment. For brief periods he has been treated as an out-patient and injected with atoxyl, but from June, 1918, to July, 1919, he was an in-patient and systematically treated with intravenous injections of tartar emetic. He was permitted to return to his home for two months, but had to be readmitted on account of recurrence of symptoms in September, 1919.

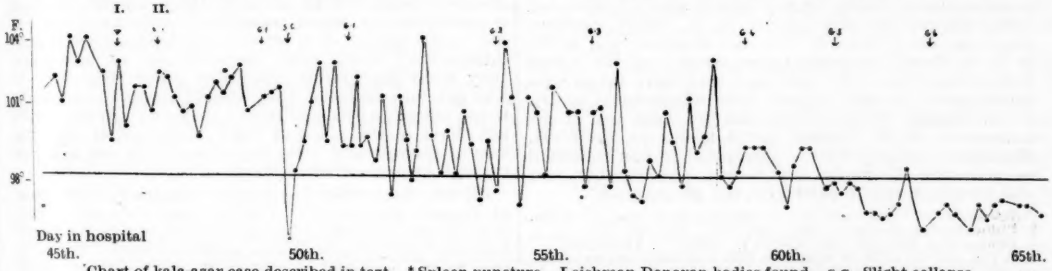

Chart of kala-azar case described in text. * Spleen puncture. Leishman-Donovan bodies found. S.C., Slight collapse. G., Gramme (stibenyl injection). I., Diagnosis made. II., Treatment commenced.

During the long period of observation he has exhibited but few symptoms of actual toxæmia. The clinical picture has been one of progressive mental and cerebral degeneration. From time to time he has exhibited a slight pyrexia of 99°–100°, but sharp bouts with rigors have been noted only after intravenous injections.

He has been extremely sensitive to antimony tartrate, and there has been no possibility of giving it in larger doses than 1 gr. at four-day intervals. The maximum dose ever exhibited was 1·25 gr. Vomiting and collapse often ensued upon the injection of 3/5 gr., and on occasions the reaction was very severe. Thus once (July 4th, 1919) he became comatose and cyanosed, with an imperceptible pulse, a condition from which he only gradually recovered after two days. Subsequently his condition became so alarming that this form of treatment had to be entirely suspended.

Towards the end of 1919 and beginning of 1920 his condition became progressively worse. He was confined entirely to bed. Muscular weakness and incoördination were considerable. His pulse frequently became feeble and irregular, and, most significant of all, he developed incontinence of urine and fæces, soon followed by epileptiform fits accompanied by screaming, enuresis, biting of the tongue, complete unconsciousness and conjugate deviation of the eyes to the right. Three of these fits were recorded—Jan. 12th, March 1st and 2nd, 1920. Each fit lasted 10-20 minutes, after which he had a paresis of arms and legs lasting for three or four days.

Up to the last date he had been treated with a total of the following drugs during four years:—55 gr. of intravenous tartar emetic; 25 gr. of soamin, intramuscularly; 48 gr. of atoxyl, intramuscularly (finally discontinued on account of threatening blindness).

On March 5th, 1920, injections of stibenyl were commenced, at first in a dose of 0·1 g. working up to a maximum of 0·3 g. From that date up to June 1st he has had a total of 4·5 g. No untoward symptoms have been noted and the improvement has been progressive. On April 21st he commenced to get out of bed and since then he has gradually accumulated strength and mental equilibrium, so that now he has been able to leave hospital and return home for a short period. It cannot be said that his nervous system is now normal, though there is no evidence of any serious lesion. His gait is somewhat uncertain and he walks with his head bowed and the expression of his face is mask-like. All reflexes are increased, otherwise he is in good condition, he eats and sleeps well, and takes an interest in life.

Naturally it is impossible to say at present whether symptoms may not recur at some future date, but the remarkable improvement which has taken place latterly can only be ascribed to the action of this organic compound of antimony. Improvement commenced directly the drug was substituted for tartar emetic, and he was able to tolerate an injection of stibenyl at least four times as great as the maximum dose of tartar emetic ever given him, and within two months he had more antimony when given in this form (69·3 gr.) than in the whole of the previous four years.

It may be argued that the remarkable improvement which has taken place is merely one of those mysterious lucid intervals which have been noted in cerebral trypanosomiasis, but it must be remembered that, when the treatment with stibenyl commenced, a fatal termination appeared imminent; previous experience has shown that a case of trypanosomiasis which develops epileptiform fits proves invariably fatal. It is possible that the trypanosomes remained hidden in the cerebral substance in this case, as suggested by the work of Stevenson,[18] and therefore could not be demonstrated in the peripheral blood.

Successful Treatment of a Case of Kala-azar by Stibenyl.

History of the case.—A Goanese lascar, aged 20, was admitted to the Albert Dock Hospital from a B.I. steamer on April 3rd, 1920, with a history of continuous pyrexia for the previous two months. On admission he was found to be severely ill with a remittent temperature of 102–103° F., and from his physical signs the illness was first thought to be pneumonia, but as the pyrexia continued after disappearance of pulmonary signs the diagnosis was obscure. Subsequently he was transferred to the Tropical Diseases Hospital, Endsleigh Gardens. Soon a swelling appeared in the left hypochondrium and extended three fingers' breadth below the umbilicus in a downward direction; posteriorly it could be mapped out in the region of the scapula; in an upward direction it displaced the apex beat of the heart to the third intercostal space Soon the tumour, which was extremely tender, could be distinguished as the spleen. The liver was enlarged slightly upwards and downwards, 1 inch below the costal margin. The blood count was at first by no means typical of kala-azar; the red cells numbered 3,500,000; leucocytes 7500, and the large mononuclears totalled but 4 per cent. The hæmoglobin was 50 per cent.

On May 8th, 1920, numerous Leishman-Donovan bodies were found by spleen puncture and were subsequently cultured on N.N.N. medium (Dr. J. Gordon Thomson). At this date the blood changes were much more characteristic of kala-azar, a leucopenia of 3500 with a mononuclear rise of 14 per cent. The pyrexia in the meantime assumed an intermittent type with frequent double rises to 103° and 104° during the 24 hours. The patient had become extremely emaciated and feeble, being hardly strong enough to turn in bed.

On May 19th, treatment with stibenyl commenced, consisting of intravenous injections on alternate days, the first dose being 0·1 g. and working up to a maximum of 0·6 g. With the exception of slight collapse following the second injection, no untoward symptoms have been noted. The improvement of the patient has been remarkable, and, after a total of 2·3 g. (35·4 gr.), his temperature has fallen to normal within 14 days (see Chart). The spleen has receded within the costal margin, and is now scarcely palpable. His general condition has steadily improved. On June 4th his spleen was again punctured, but only two Leishman-Donovan bodies were found in numerous preparations, and one positive culture was obtained. He is now up and about and gaining in vigour every day. He has had no further treatment and up to date (July 17th) has put on over 28 lb. in weight. His blood has improved considerably, the hæmoglobin now being 75 per cent., red cells 4,125,000, whites 6000, and mononuclears 4 per cent.

There are no signs of any relapse at present, but naturally it is intended to keep him under observation for a lengthy period.

Remarks.

The important points in this case are the extremely rapid action of the drug and the almost complete absence of any toxic symptoms after injection of 0·6 g. (9·24 gr.). There is little doubt in my mind that the patient has been cured, and in a remarkably short time.

Acetyl-p-aminophenyl stibiate of soda (stibenyl) is a brownish powder, easily soluble in water. The resulting solution is slightly yellow. Larger amounts, such as 0·6 g., are dissolved in 30 c.cm. of distilled water and injected by the open method. The vein should be flushed by a preliminary injection of saline. No irritating effects of the salt at the site of injection have been noted. The symptoms of a reaction following the second injection of the drug when much larger ones were subsequently tolerated with impunity may possibly be ascribed to the too rapid plasmolysis of the parasites and consequent liberation of their toxins. It is necessary that one should distinguish between a reaction of this sort and symptoms due to the toxic effect of antimony itself.

There has been a complete absence of any toxic phenomena—no vomiting, cough, nausea, or præcordial pain—as often noted after injection of the tartrate.

It is interesting to note that stibenyl is without effect upon benign tertian malaria. Two cases have been tried, and continue to have typical rigors on alternate days after 1·4 g. of the drug. Curiously enough, it appears to have no effect in bilharziasis. One case of urinary bilharziasis continued to pass living ova after 4·5 g. (68·3 gr.), but was subsequently cured with 16 gr. of tartar emetic.

While admitting that my experience has yet been small, owing to the paucity of suitable cases, the favourable results recorded, and the large doses of the drug tolerated, suggest that by combining organic chains with antimony in this manner a preparation has been evolved more specific than any yet employed for leishmaniasis. The experience already gained warrants a more extensive trial in an endemic area of kala-azar.

My thanks are due to Dr. A. L. Gregg, medical superintendent, Tropical Diseases Hospital, and to Dr. G. B. H. Hawes, formerly house surgeon at the Albert Dock Hospital, E., for the care they have taken with these cases. I must express my indebtedness to Dr. C. W. Daniels for permitting me to make use of his notes of E. W. S. Special credit is due to Mr. W. H. McCallum, not only for the enterprise he has exhibited in procuring the acetyl salt in the first instance, but also for his energy in perfecting the preparation. .

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SOCIETY OF MEDICAL OFFICERS OF HEALTH: TUBERCLE GROUP.—The first annual meeting of the tuberculosis officer group, recently formed within the Society of Medical Officers of Health, was held on July 17th. Dr. F. N. Kay Menzies presided, and the business included the passing of the constitution of the group, the election of officers, and a discussion of the programme for the ensuing year. Dr. Benjamin Moore was elected president, with Dr. F. G. Caley as secretary and Dr. J. Sorley as librarian. A representative council of 25 members drawn from all parts of the country and from all branches of the work was formed. Dr. H. A. Ellis will be the chairman of this council. Meetings will be held monthly throughout the year, the presidential address being given to a meeting of the full society. Other meetings will be held at dates decided by the council to deal with discussions upon any topic of pressing interest and to receive reports from committees on special subjects. The central aim of the group is to draw together a strong body of tuberculosis workers of all kinds whose opinion when expressed may be a guide to the parent society and to the Government in the future development of the tuberculosis campaign.

SUDDEN DEATHS ON ACTIVE SERVICE.[1]

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SUDDEN death in one sense is, of course, one of the necessary accompaniments of war. I do not, however, propose to speak of the military side of the subject, though many of the cases of wounds, asphyxiation from gas, and death apparently from shock only, which it became my business to investigate, were of great interest and not a little importance. I intend rather to discuss some of the cases on which I made post-mortem examinations which come within the sphere of civil practice, and I have selected those cases in which, in England, an inquiry by a coroner would have been considered necessary. In many cases a "court of inquiry" was held, though I was by no means always summoned to attend, and in others no such inquiry was deemed necessary.

Nor, again, do I propose to include a number of accidents, some of which were incidental to the war, but most of which were caused by the usual sort of carelessness which causes so many of the accidents of civil practice.

In any campaign of large dimensions it would be strange if no cases of death occurred from other causes than wounds and sickness. The number of troops engaged on the front in France formed a considerable population and a very mixed one. The circumstances were, in many places, such as to cause hardships, heavy strain, at times privation, and almost always a greater or less degree of excitement and anxiety. Even though the men had passed a medical examination on enlistment, many escaped rejection who certainly were not fit to meet these conditions, and some whom any doctor would have judged to be fit did not stand them. Men often found themselves in conditions they would never have dreamt of, and when they were passed into categories lower than "A" it was not intended that they should be in those conditions, but circumstances were constantly arising which left them in the place of "A" men, and though the vast majority were little the worse some did not pull through on account of medical unfitness.

All the cases which I propose to discuss died at a base in France, though most had at some time previously been in the fighting line, and many would doubtless have returned there. Some, however, were "B" men, and were employed on base duties. All of them occurred between January, 1917, and January, 1919.

Sudden Death from Natural Causes.

As in civil practice, the most common accompaniment of sudden death from natural causes was found to be some disease of the cardio-vascular system, and of the heart and its vessels in particular. Out of 15 cases of this character, the cause of death was referable to vascular system in 12, 3 being cases of fatty myocardial degeneration, 6 of fibroid degeneration (more or less degeneration of the coronary arteries being present), 2 ruptured aneurysms, and 1 cerebral hæmorrhage. The remaining three non-vascular causes were: (1) a cerebral tumour; (2) diabetes mellitus; and (3) "gastrostaxis."

The following is an instance of death from coronary atheroma in a young subject.

The man, aged 30, was a gunner in an anti-aircraft section, and was on duty one night when there was a raid. No bombs fell within a considerable distance of him, and his gun was not fired, but he dropped down dead at the beginning of the raid. He had extensive atheroma of his coronary arteries, but none elsewhere, and a hypertrophied heart; nothing else abnormal was found in his body. Presumably the mere excitement of the moment was sufficient to cause death in a man with arteries such as his, given the mental temperament. From an ordinary examination of his heart few during life would have suspected coronary disease; he

[1] A paper read before the Medico-Legal Society on May 28th, 1920.

probably had no murmurs, and his heart would have passed for that of the strong and active man which his age and physique suggested.

The remaining cases of this type presented no features of particular interest. They were chiefly older men, and the common trio of granular kidneys, myocardial disease, and cerebral lesions was found, one or other of the three being the immediate cause of death. There were, however, two cases in which death was due to the rupture of an aneurysm of the aorta. The usual features of syphilitic disease of the aorta were found. Both aneurysms were situated in the descending part of the aorta—that is, where diagnosis is most difficult. One was a purely thoracic aneurysm, and burst into the left pleural cavity; the other involved the abdominal as well as the thoracic aorta, and made its way into the right pleura.

Of the last three cases, in which the cause of death was natural, undiagnosed diabetes accounted for one, and very likely I should have missed it too had my sense of smell for acetone been less acute. The man was hurried down from the front line during a rush after heavy fighting, which must serve as the explanation of the failure to diagnose.

The cerebral tumour case was not without interest, for death resulted in an unusual way. The man had had no previous symptoms whatever, and suddenly fell down dead on parade one morning. He was under no unusual physical strain, but the weather was hot. A tumour, about the size of a walnut, was situated in the position of the pineal body, and had led to great and rapid distension of the lateral ventricles. The tumour had apparently arisen from the choroid plexus, and on section proved to be a psammoma.

Gastrostaxis is not a common form of death, and perhaps the name is not well chosen, but as no other cause was found perhaps it will serve, as it did at the time.

The case was that of a young man who was found dead, having vomited a great deal of blood, and a quantity was found in the stomach and bowel. No source was found of this hæmorrhage after very careful search. The mucous membrane of the stomach was a little "eroded" and discoloured over all but that portion against which the bubble of gas had lain. It was considered on this account that the erosion was a post-mortem phenomenon, and of doubtful significance. Bleeding from the stomach or bowel was not uncommonly found in France as the cause of death in cases severely wounded and very septic. In such cases, however, one or more small ulcers were always found in the stomach, small or large bowel, or even in the œsophagus. No such condition was present in this man.

Cases in which Death was due to Suffocation.

I made post-mortem examinations on eight men who died as the result of suffocation. Of these three were found face down in sand, having inhaled a certain amount of it, two died under an overturned motor-car, and three had inhaled vomited material. Probably the first three were alcoholic, though it was proved in one only. None had bitten his tongue, or showed other sign of having had a fit, and two actually had tooth-plates in position in their upper jaws. In each case sand was found in the upper air-passages, in one down to the second division of the bronchi, showing that respiration had taken place after falling. No reason was found for a fall in an unconscious state, but the general appearance of the men suggested alcohol as the most likely. I do not now remember how many of these occurred on Saturday night, but generally Sunday was the day of greatest liberty. The two under the overturned car showed no external injuries, but the body of the car was lying across their chests in such a way as to prevent them breathing. They showed the usual signs of asphyxia, and one had hæmorrhages in the base of the tongue and in the substance of the tonsils.

Of three who inhaled vomited food, two were undoubtedly alcoholic. Their stomachs were found practically empty, but both the residual food and that inhaled smelt strongly of alcohol. In one of these cases food was found in the smallest recognisable bronchi; in the other larger fragments had prevented such complete inhalation. The third of these cases was a German prisoner of war, in whom alcohol could definitely be excluded. He was eating at the time of his death, and was believed to have had some kind of fit. All of these three cases showed œdema of the meninges, though whether this was the cause of the vomiting or the effect of suffocation is hard to say.

Deaths from Drowning.

In all, 18 bodies were brought for examination in whom death was due to drowning: 6 washed up after the sinking of torpedoed vessels, 1 fell into the river (recovered three days later), and 11 bathing accidents. All the bathing cases were seen within a few hours, but the others not for some days after death had occurred.

Apart from the immediate cause of death, there were cases—all bathing accidents—in which morbid conditions were found other than those attributable to death from drowning, and these may or may not have been contributing factors in particular instances. The coast was admittedly a dangerous one, but bathing accidents did not, as a rule, result from currents, and, for the most part, took place in comparatively shallow water. Among these secondary morbid conditions was one, which I found in three cases, and which interested me a good deal at the time, though I was unable to establish the theory I had formed with regard to it. Quite apart from the distension of the right chambers of the heart, there was great dilatation of the left side of the heart, and, in addition, pallor and friability of the muscle, without valvular disease. The three cases which showed this condition occurred within a short time of one another (at the end of July, 1918), and I believe they had all had influenza, and that the condition was attributable to that disease. In one of these cases I examined the heart muscle histologically, and found that fatty degeneration was present, though the subject was quite a young man. Of course, there are other diseases which might have produced the same result, but as influenza was prevalent at the time that seemed the most probable.

Other contributing factors in drowning cases were: old disease of the mitral valve, enlargement of the thymus gland, and in one case a small tumour at the side of the pons, a psammoma arising from the dura mater.

In cases of drowning external injuries are of importance. In the bathing cases such injuries were only trivial, occurred on the face, shoulders, and legs, and were the kind of injury that might result from dragging the dead man up the beach. Other wounds were produced prior to death, as, for instance, a severe gash on the lower jaw in a man from a torpedoed vessel. He had been several days in the water, as was evident from the condition of the skin, and the emptiness of the intestines suggested that he had not died for some time after taking to the water, but the wound was beginning to heal, and, in addition, his face was shaved to within half an inch of the wound, which clearly must have been done while still on board ship. Another had a recently healed skin wound of the head; nobody knew how he came to fall into the river, but this recent injury may have had something to do with it. A third, a member of the military police, had an old head injury, which had been trephined years before; he was drowned while trying to rescue another man.

I once had the unpleasant duty of identifying a nursing sister, who had been in the water three months after the sinking of a hospital ship. She was quite unrecognisable, and the body was largely converted to adipocere. She was identified by cutting off small portions of marking tape from various garments and putting them together. The time of her immersion was guessed from the fact that she had on her several £1 currency notes, which were of two different issues; as she was probably engaged in cross channel work she would be likely to get notes of the present issue soon after they were made current. Deductions based on these assumptions proved to be correct, and her identity was established.

As regards the morbid appearances of drowning, the classical froth on the lips, sand or weed in the trachea, and weed grasped in the hands, were met with only twice, in both instances in bathing accidents. Water

was found in the lungs in 14 out of 18 cases, and in the pleural cavities in 9. Subserous hæmorrhages occurred in 6, in the lungs in 3, in the lungs and liver in 1, and under the visceral pericardium in 2. Small hæmorrhages were found in the brain in one case.

A matter which interested me, as a novice in this kind of work, was the occurrence of water in the pleuræ of half of these cases of drowning. The water was generally equally distributed over the two pleuræ, and about a pint to a pint and a half in amount. It was not contaminated with blood or froth, and seemed in all respects similar to the water from which the body had been removed, but I had no means of making any analyses. The books to which I have had access refer only in a passing manner to this phenomenon, as if it were easy of explanation, or so uncommon as to need none. I searched the surfaces of the lungs carefully but could find no rupture. I distended a lung with water, but found no leak, nor did I expect to find one, for had the solution been so easy some blood should have been mixed with the water, and further, the equal distribution on the two sides suggested a general rather than a local cause. Water was found in the pleura only in bodies which had been in the water for a considerable time, and was not found in a few who were removed soon after death had occurred. This fact suggests that the phenomenon is a post-mortem one. It occurred to me that it might be explained in this way. At a certain time after death oxidation processes consume most of the air remaining in the lung alveoli; this leads to water being sucked down into depths of the lung which were air-containing previously, and perhaps the negative pressure in the pleura leads to the transudation of this water into the pleural cavity. I do not know if this is the correct explanation, but it seems possible, and especially if the body is lying in the water, face down.

Death from Suicide.

During the two years from January, 1917, to January, 1919, I examined the bodies of 11 cases of suicide, which exemplified three methods of committing the act: 4 by shooting, 2 by hanging, and 5 cut-throats. Of the 11, 1 was an officer and the others men. As far as I could ascertain, the underlying reason in most cases was worry, sometimes about domestic affairs at home, sometimes about loss of relatives at the front, and some undoubtedly were occasioned by an order to proceed to the firing line on the following day. I was not present at the inquiries held on any of these cases, because, I suppose, the cause of death was thought to be sufficiently obvious not to need medical evidence.

A. *Suicide by Shooting.*

The weapons used were naturally the service rifle and the service revolver, the latter being the officer's choice. The method of using the rifle was to put the muzzle into the mouth and press the trigger with the toe. The amount of damage that can be done in a fraction of a second by this means is perfectly extraordinary, and death can hardly be other than instantaneous, for as the weapon is of necessity directed somewhat backwards the bullet often passes through the pons or medulla. In one case the bullet followed almost the middle line, passing through the pons just to the left of the falx cerebri, wounding the longitudinal sinus, and leaving the skull just to the left of the sagittal suture. Such cases illustrate very well the great "explosive" effect of a rifle bullet discharged at short range, which is much more extensive than that caused by a revolver. Any skull in which the cranial cavity is penetrated by a rifle bullet, at such short range as this, is split like an egg into a large number of separate fragments by extensive fractures which intersect one another in different directions. Two of the three who chose the rifle had their skulls broken in this way. The third aimed badly, the bullet passing through the left ramus of the jaw, the jugular bulb, and out through the mastoid process, and not entering the skull at all. The left ear was completely disorganised, and the base of the skull extensively damaged by a number of radiating fractures.

Another point of interest in cases shot through the mouth is that although the weapon was introduced between the upper and lower jaws, yet the lower jaw is generally fractured as well as the upper. I imagine the mechanism of this phenomenon to be as follows. The explosive effect of the bullet, and the large volume of gas discharged, forces the fragments of the base of the skull apart in all directions, if only momentarily. The temporo-mandibular joint is a strong one and not likely to be dislocated by rupture of its ligaments; consequently the rami of the lower jaw are separated forcibly by the explosive effect. Fracture then takes place at the weakest point, through one or other canine fossa. Frequently, too, the lower lip is split in these cases, but the sudden discharge of gas into the mouth or the recoil of the weapon may be sufficient to account for that.

One officer in this series committed suicide by shooting, but he used his revolver, the entry wound, with typical powder blackening, being in the right temple. The bullet passed through the brain from side to side, destroying the pituitary body and sella turcica on its way. The ventricles of the brain were filled with blood, though I could not show that they were actually injured; I expect they were. The splitting of the skull as a whole was not so great in this case as in those preceding, injury being more restricted to the immediate track of the bullet. (Specimens were shown to illustrate the effects of rifle and revolver discharged at close range.)

B. *Suicide by Hanging.*

There were two instances of this, both being in men of middle age. In both death was due to asphyxia and not to injury of the spine or spinal cord. In neither case was I present at the court of inquiry, and I heard nothing of the circumstances under which the bodies were found, but if they were completely suspended they had not dropped far. The usual statement is that the mark of the cord is far more often found above the larynx than below it, and the cord is supposed to slip up when it takes the weight of the body. In one of my cases the mark was definitely below the level of the larynx, and in the other it was across the cricothyroid membrane. It seems to me that at whatever level the cord is applied in the first place it is bound to rise later, and whether the final mark is above or below the larynx depends on whether or not the skin sticks to the cord, as would tend to be the case if the cord were tightly fixed. In any case the skin would return towards its original position if the body were soon cut down. A point which is contradictory to this view is that there was no mark of a knot in either case. One of these men had a considerable hydronephrosis, due to the presence of several stones in one kidney.

C. *Cut-throats.*

In this small series of suicides there were five cases of cut-throat, which makes this method the most common. In all cases the weapon was the razor. The general character of the wound produced was not abnormal, though the extent of injury was various. All were of greater depth and extent on the left side of the neck, and all but one extended to the right side. In that case there were two cuts, both high up and fusing into one at the lower extremity. One was a small and superficial cut, and divided little more than the skin; the second was deep, laid open the larynx, dividing on its way the left external carotid artery and external jugular vein, and the left sterno-mastoid muscle as well.

One of these cases in particular interested me.

A sergeant inflicted two cuts on the left side of his neck, which joined into one large gash just above his larynx, and extended to the right side. The spine was visible through the wound. He had divided the thyro-hyoid membrane, both internal jugular veins, and both superior thyroid arteries, but had left the carotid arteries intact. The œsophagus, prevertebral muscles, and the disc between the fourth and fifth cervical vertebræ were all injured. After doing this he put away his razor into its case, and that into its usual place in his kit-bag, causing later a certain amount of trouble owing to the disappearance of the weapon.

I will only refer to one more of these cases, that of an officer who cut his throat in hospital.

He had been admitted on account of neurasthenia, and was therefore a likely subject for such an action. Of course, his revolver had been taken from him on admission, as was the rule, which probably accounts for his having chosen this means rather than shooting. He cut himself from ear to ear, dividing both internal and both external carotid arteries, an unusually high and consistently high wound. Both vagus nerves were uninjured. In this man's case the reason for his action appeared to be the fear of losing his recently won promotion if he were sent home to England, as seemed likely in view of his mental state.

The few cases I have narrated, and the larger number to which I have only alluded, make a formidable collection to compress into a short paper, but I think the number is not out of proportion to the population from which they were drawn. At Etaples there was always a large number of men in the base depôts, as well as a considerable permanent local personnel. Probably at any one moment there were seldom fewer than 80,000 men, and often there must have been more. So far as the base depôts were concerned, this population was constantly being drawn upon, and as constantly replaced, so that the number of men who had been at Etaples during the two years 1917 and 1918 must have been very great, and it is from such figures that any opinion as to the frequency of the various causes of sudden death must be formed. Nor do I think that my experience differs much from that of other medical officers doing similar work, but I had the good fortune not to be moved about, and this enabled me to keep my records in order.

INTRINSIC CANCER OF THE LARYNX.

IMPAIRED MOBILITY OF THE AFFECTED CORD IN DIAGNOSIS AND PROGNOSIS. OBSERVATIONS BASED ON 44 CASES TREATED BY LARYNGO-FISSURE.[1]

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Historical.

INTERFERENCE with the movement of a vocal cord as a symptom in certain cases affected with cancer appears to have been first noted by Lublinski[2] and Semon[3] at about the same date. It was unfortunate that in one of his early communications Semon suggested that impaired mobility was a usual symptom and occurred at an early period of epithelioma of a vocal cord. In 1886 he wrote:—

"It is, in my experience, one of the most constant and valuable points of differential diagnosis between innocent and malignant tumours of the vocal cords, that the latter usually cause a considerable impairment of the mobility of the affected cord at a very early period—i.e., when only a small projection can be seen on the cord."[4]

Somehow the doctrine became circulated that impaired mobility was a usual symptom, and that if the cord moved freely or if the microscopic examination of a removed fragment (when this was feasible) was negative, a diagnosis of malignancy was not justified, and the case then had either to be treated as an innocent condition or left to develop. It has come my way to see no inconsiderable number of cases where this conception has led to disastrous results by losing the moment for successful operation. I regret to say that this mistaken and misleading opinion is still very widely held, although Semon himself, with more extended experience, saw the need of correcting the misconception. Twenty-one years later he formulated the following rule:—

"If the vocal cord from which a suspected laryngeal growth springs shows at an early period of the disease a defect of mobility other than due to mechanical impaction of the growth in the glottis on phonation, this sign is almost pathognomonic for the malignant character of the tumour. If, however, this sign should yet be absent when the case comes under observation, such negative evidence does by no means exclude possible malignancy."[5]

I quite agree with this rule. I would also recall that Semon only values this impaired mobility as a diagnostic aid in distinguishing between malignant and benign growths of the cords; it is of slight value in helping to differentiate epithelioma from tubercle or syphilis. When present, as Semon says, "it is a sign of great importance," and the observations here submitted will, I hope, help to establish the relative frequency and value of this symptom as an aid in both diagnosis and prognosis.

The present investigation leaves out of consideration cases which were only seen in consultation and cases which were not operated on. I thought that more valuable conclusions might be arrived at by limiting the investigation to cases which I had operated on by laryngo-fissure, in which the diagnosis in every case was confirmed by microscopic examination of the removed growth, and in which the after-history of each case has been followed up to the present date or until death.

Frequency of Impaired Movement.

I have had 44 such cases. In all of them the mobility was carefully examined and recorded on several occasions. Mere mechanical interference with the excursions of the affected cord, due to the projection of the growth, was noted when it was present, but is not recorded as an instance of impaired intrinsic mobility. Leaving such cases out of count, I find that of these 44 cases the affected cord was quite mobile in 27. In the remaining 17 cases its movements were more or less impaired, the degree varying from mere sluggishness to complete fixation. In three of these latter cases the defect in movement developed while the cases were under observation after periods of 10 days, 6 weeks, 6 months, or 9 months. In one case a feebleness in the tension and adduction of one vocal cord was noted two years before the patient returned with a subglottic malignant growth.

It was only possible to remove a satisfactory portion of growth before operation for microscopic examination in 10 out of these 44 cases. But it is noteworthy that in no less than 8 out of these 10 cases the cord moved freely. This shows that impaired mobility, when present, is a valuable diagnostic aid, as it is more apt to occur in cases where we cannot obtain a satisfactory piece of growth for examination. This is as we should expect—viz., that when a growth is embedded in a cord or tends to penetrate it the neoplasm is more likely to produce paresis than when it is projecting, or even (as in some cases) semi-pedunculated, for then a good portion (or even the entire tumour, as shown in one of my cases[6]) can be seized and removed through the mouth.

There was no mistake in diagnosis in any case. In one instance (No. 30) a very small, snow-white, papilloma-looking growth on the anterior third of a vocal cord was viewed with suspicion, as the cord was sluggish in action. The growth was removed absolutely level with the cord by the indirect method, and, after microscopic examination, reported to be a simple papilloma. Ten weeks later, as the anterior half of the cord was still less mobile and the surface of the cord had not healed over with a smooth, clean cicatrix, I proceeded to a laryngo-fissure. The growth in the cord, when exposed, was so small and uncertain in character that it was only after consulting the patient's son and family physician, and after their agreeing to removal of a growth of merely suspicious character, that I completed the excision of the cord. On examining this microscopically Dr. C. Fletcher reported that "the features are suspicious but the evidence insufficient to warrant a definite diagnosis of malignancy." The slides were then sent to Professor Shattock, who reported:—

"At the spot of thickening there is a distinct, somewhat wedge-shaped ingrowth. The superficial cells of the thickening are keratinizing. The epithelial cells of the ingrowth have lost their typical characters, and have, at the margin, wandered into the circumjacent connective tissue. My diagnosis is—a very early stage of carcinoma."

[1] A paper read before the Summer Congress of the Section of Laryngology, Royal Society of Medicine, London, June 24th, 1920.
[2] W. Lublinski: Berlin. klin. Woch., No. 8, Feb. 22nd, 1886, p. 122.
[3] Heath's Dictionary of Practical Surgery, vol. i., London, 1886, p. 895.
[4] Transacs. Clinical Society, London, vol. xx., 1886, Nov. 12th, p. 44.
[5] Transacs. Medical Society of London, vol. xxx., 1907, p. 113.
[6] StClair Thomson: Intrinsic Cancer of the Larynx; Complete Excision Apparently Effected by Endolaryngeal Operation, THE LANCET, May 30th, 1914.

This case is quoted to illustrate the anxieties in the diagnosis of some of these cases, the difficulties of the morbid histologist, and the value of impaired mobility, when present, in helping the diagnosis.

Valuable in Prognosis.

As to its value in prognosis:—Of the 27 cases with a mobile cord 21 are alive and free from local recurrence. Two have had local recurrence, 1 is dead from cancer in another part of the body, and 3 have died from other causes.

But of the 17 cases with impaired movement only 7 are alive and free from recurrence. Five have died of local recurrence; 1 died of recurrence in the glands; 1 from hæmorrhage following operation; and 3 have died from other causes. It is evident that when a case of intrinsic laryngeal cancer presents itself the prognosis is decidedly less satisfactory—so far as regards the ultimate result of a laryngo-fissure—if the cord is paretic or fixed. In such cases it would be well to consider carefully whether the usual laryngo-fissure is adequate, or whether some more extensive removal should not be initiated at once.

Conclusions.

1. Impaired mobility of a cord is not a necessary or frequent symptom of intrinsic cancer of the larynx.
2. It is, in fact, only met with in a minority of cases presenting themselves for diagnosis.
3. It is more apt to be met with in an early case when the growth is embedded in the cord or growing into it than in a distinctly sessile or even pedunculated tumour. It is also more usual with growths situated on the inner surface or the subglottic area, than with those seated on the upper surface of the cord. Otherwise, fixation indicates an advanced case.
4. When present it is a very valuable symptom in distinguishing a malignant from an innocent tumour. It is of little value, and may even be misleading, in diagnosing a malignant growth from a tuberculous or syphilitic deposit.
5. While in some cases it may be necessary to postpone a diagnosis in the absence of this symptom, yet, as it is desirable to avoid any delay, we may have to rely on inspection, the age, sex, history, and progress of the case, and the exclusion of other possibilities. The help of microscopic examination of a removed portion is only available in a small number of cases (10 out of 44).
6. As regards prognosis, it is an unfavourable symptom.[7]

THE PSYCHOLOGICAL ASPECT OF THE EFFORT SYNDROME.

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ON taking a general view of the war psychoneuroses we find that they reproduced all the symptoms ascribed to functional nervous disorders in civil life; very few symptoms were observed that had not been seen before, and conversely, what had been previously described could be illustrated. We find the usual bodily manifestations of hysteria: paralyses, contractures, incoördinate gaits, tremors, aphonia, mutism, blindness, deafness, fits, fugues, and somnambulisms; and on the purely mental side we find depression, irritability, anxiety, loss of volition, and psychasthenic symptoms such as phobias and obsessions.

The apparent absence of any well-known symptom group calls for explanation, and the following extracts from Osler's text-book on "The Principles and Practice of Medicine" (fourth edition, 1901) refer to conditions which are not found, prominently at any rate, in accounts of the war psychoneuroses. On p. 1118 we read, under the heading of hysteria:—

"Rapid action of the heart on the slightest emotion, with or without the subjective sensation of palpitation, is often a source of great distress. A slow pulse is less frequent. Pains about the heart may simulate angina, the so-called hysterical or pseudo-angina, which has already been considered. Flushes in various parts are among the most common symptoms. Sweating occasionally occurs."

On p. 1126 we read, concerning neurasthenia:—

"In other cases the *cardio-vascular* symptoms are the most distressing and may occur with only slight disturbance of the cerebro-spinal functions, though the conditions are nearly always combined. Palpitation of the heart, irregular and very rapid action (neurasthenic tachycardia), and pains and oppressive feelings in the cardiac region are the most common symptoms. The slightest excitement may be followed by increased action of the heart, sometimes associated with sensations of dizziness and anxiety, and the patients frequently have the idea that they suffer from serious disease of the organ. Attacks of pseudo-angina may occur.

Vaso-motor disturbances constitute a special feature of many cases. Flushes of heat, especially in the head, and transient hyperæmia of the skin may be very distressing symptoms. Profuse sweating may occur, either local or general and sometimes nocturnal.

Cardiac Patients with Psycho-neuroses.

If we look for symptoms corresponding to these descriptions we find them recorded, not among the psychoneuroses of war, but among those cases known as soldier's heart, the effort syndrome, or disordered action of the heart (D.A.H.).

Some quotations from the Report to the Medical Research Committee[1] on the subject will show this correspondence of symptoms.

P. 5.—"*Pain* is an inconstant but frequent symptom and one which, when present, varies in degree from precordial discomfort to pain of anginal distribution; it is especially associated with exercise ....." "Giddiness is almost constant, and is associated with change of posture and with effort. Attacks of fainting are less common, and their associations are less clearly defined." "Palpitation ..... is very frequent, especially during and after effort." "*Coldness* of the hands and feet, *sweating* of the hands and feet, or excessive sweating of the body generally are very common."

P. 6.—It is the custom to find relatively rapid heart action in all circumstances, but the chief difference between the patients and healthy subjects in this respect is an exaggerated response of the heart-rate to emotion, exercise, and posture." "Intermittence of the heart, or an irregularity which clearly accompanies respiration when this is deepened by request, is not uncommon."

P. 25.—"In many of the patients flushing is easily provoked by relatively slight causes."

The similarity of the symptoms is insufficient to do more than suggest a resemblance between "nervous" and "D.A.H." cases. Osler obviously regarded the troubles he described as only a part of the more important nervous condition, and if we search the Report we find that nervous symptoms are in no wise lacking, for throughout it are scattered observations on the nervous aspect of the cases which only need a little emphasis to carry the resemblance to the point of identity. Some of these observations are:—

P. 5.—"*Exhaustion* is an almost constant symptom; it is usually provoked by sustained effort, but in a degree far in excess of that due to fatigue in healthy men. In severe cases it is a continuous symptom, and is not only physical but is equally mental." "*Headache*, which is almost constant, frontal or throbbing in type, often severe, and usually an after-symptom of exercise." "*Irritability* of temper, sleeplessness, inability to fix attention, shakiness, flushing, are common, especially the last three named." (P. 7.) "Many of the patients acquire the diagnosis of *neurasthenia* from time to time qualified by the phrase 'of the vaso-motor type'; especially is this so when brisk reflexes are associated with mental irritability or exhaustion."

(P. 59).—"Though emotional disturbances are more common than in healthy people, being exhibited in rare cases to a very abnormal degree, and though irritability of temper, lack of concentration, apathy, and depression are frequent symptoms, yet these disturbances are less pronounced than in patients who are commonly classed as neurasthenics."

It may be assumed that these observations were made without any deliberate psychological investigation. Nervous patients have a tendency, unrecognised by themselves, to stress their bodily symptoms and to remain silent about their painful thoughts and emotions; for this reason the deeper troubles associated with the effort syndrome may escape notice; the dyspnœa, faintings, palpitation, and heart pains become essential symptoms, and when accompanied by a rapid pulse form a picture which is regarded as complete. If the patient is asked about nervous symptoms he may, especially if he is of a temperament inclined to hysteria, deny anything except his heart trouble; but as a rule he will relate symptoms ranging from nervousness in traffic, ready starting at noises, depression, irritability, or insomnia, up to those of a deep-rooted psychasthenia, with phobias, obsessions, unreasonable feelings of

[7] Six patients were shown on whom laryngo-fissure had been performed at varying dates up to seven years ago. One case had presented himself with complete fixation of the infiltrated cord, but was free of recurrence three years after laryngo-fissure.

[1] Special Report Series, No. 8. H.M. Stationery Office. 1918.

incompetence or uncertainty, or even that sensation of the strangeness of the world which is described as a "loss of the function of the real."

At this stage of investigation it is easy to convince the patient that his symptoms are not due to heart disease but are only part of a nervous condition; the explanation is likely to be rejected if one tries to assure him that his heart is healthy without this preliminary inquiry into his mental state.

Psycho-neurotics with Associated Cardiac Symptoms.

Approaching the subject from the other end of the scale of symptoms, we find that men whose nervous state has been regarded as of primary importance—for instance, those diagnosed "shell shock"—show in a large proportion the rapid pulse of the effort syndrome, and if the disabilities allow of exertion the patients complain of the symptoms associated with that diagnosis; it is very common to obtain a history of previous admissions to hospital for some kind of heart trouble. (This view must be compared with that quoted above from p. 59 of the Report.)

Sensations are described in terms of heart or emotion, according to the way in which the man has been led to regard them. There are medical men who think of phobias as text-book curiosities and fail to recognise the significance of such complaints as faintness and palpitation, generally accompanied by shakiness, when the patient is in a train or a crowd, though if the man is questioned he will often describe a feeling of anxiety or fear, of which the cardiac symptoms are only the manifestations. The fainting attacks of the sufferers from the effort syndrome are really attacks of anxiety and primarily of emotional origin, being identical with the "nervous" attacks of the sufferer from an anxiety condition. There is no line to be drawn between those attacks and others, usually called hysterical, in which emotion finds expression in motor activity.

I cannot agree with the view given on p. 7 of the Report, where we read on the subject of terminology:—

> "From the standpoint of military service it is a matter of indifference what term is employed providing that the method of dealing with the patients is not thereby influenced. But the diagnosis of neurasthenia has this defect, and the latter is not counterbalanced by an appreciable insight into the pathology of the condition."

It is essential that the man should recognise his condition; he is suffering from something, and until he realises what it is he will insist upon fixing his attention on the heart symptoms. It follows that I do not regard a diagnosis of D.A.H. as responsible for the symptoms in any large number of cases; if the man's attention had not been directed to his heart he would have found some other point of fixation for his troubles. I would illustrate this by reference to a recent inquest upon an ex-soldier who, discharged for valvular disease of the heart, had worried about his condition, and eventually committed suicide. Post-mortem examination showed a healthy heart, and the coroner, according to a newspaper report, said the poor man had been condemned to death by an ignorant army doctor. This judgment was not well founded; suicides of ex-soldiers suffering from depression are too common, and this man's nervous condition both produced the heart symptoms—probably the effort syndrome—and led to the suicide. A healthy young man does not commit suicide because he is told he has heart disease, and if this man had been diagnosed as suffering from neurasthenia or shell shock the end would probably have been the same, and no one would have been blamed for it.

I have met a few men without anxiety symptoms who had been told they had heart disease, perhaps on account of a functional murmur. Their attitude is usually quite reasonable, and although they logically attach value to the diagnosis it is possible to alter their belief by ordinary argument. In pensioners of a certain temperament, however, there are obvious reasons why a diagnosis of "heart trouble" aids a resistance against any view but that of organic disease, and if a man is tending towards an anxiety state it is plainly unwise to provide him with a diagnosis which will serve as a further source of anxiety.

Treatment must be directed towards the nervous condition and not to the heart symptoms. One method to this end was used in special heart hospitals when the "heart" condition was attacked by reassurance and persuasion combined with exercise; this method is a very old one as applied to the psychoneuroses.

The Psychological Processes.

A few words about the psychological processes concerned and the way in which they influence symptoms will aid in understanding the question of treatment. In war cases the processes are more easily revealed than in cases arising in civil life, and opinion is now crystallising round the view that the psychoneurotic symptoms depend upon a repression, or loss of memory, of incidents of a strongly emotional content. Though lost to consciousness these memories produce and maintain symptoms; they may produce stammers or tremors, hysterical fits, or paralyses and contractures. These bodily symptoms may also serve to gain an end otherwise unattainable by the patient—such as avoiding military service or some difficulty of adaptation—and the knowledge of this end may be the repression chiefly concerned; this "secondary function" is characteristic of the hysterical type of patient, in whom the emotional content of the repression may be so well fixed by the symptom that he shows no other signs so long as he is allowed to retain his bodily disability. This type passes gradually into that in which no secondary function is conceivable, and the disturbances are supported only by the emotional content of the repression, which shows itself in an anxiety state, accompanied or not by bodily symptoms.

In this latter group are men whose repressions find vent in phobias, anxiety attacks on slight or no provocation, fainting spells, or apparently causeless fear and apprehension. The patients are in a permanent emotional state.

The Connexion Explained.

So far I have presented conclusions supported by a considerable weight of experience and based upon psychological investigations carried out by many workers. Their application to explain the associated cardiac symptoms contains a speculative element. Certain signs, such as fine tremors of the hands and closed eyelids, together with a nystagmoid twitching of the eyes when lateral movements are tested, are associated with that muscular lassitude of which so many complain, and suggest a lack of tone dependent upon interference with the endocrine glands. Terror is accompanied by an increase of the adrenalin content of the blood; a continued state of emotion may, by affecting the ductless glands, produce the muscular signs above described, as well as the symptoms of the effort syndrome which accompany them. Whatever their cause, these symptoms differ from the purely hysterical ones in being unrelated to volitional control.

We can picture disturbance taking place at different levels of the nervous system; interference with the cortical centres gives us motor and sensory changes, generally called hysterical, as well as purely psychical ones. These we may call psychoneuroses, the more suitable word "psychosis" being already appropriated to indicate insanity. When the thalamic centres are involved—whether by over-stimulation or by loss of cortical control—excessive response is shown by ready starting at ordinary noises or by exaggerated reflexes, as when a tap upon the patellar tendon is followed by a general muscular reaction of the whole body. At a lower level the autonomic functions are disturbed; this is shown by increased sweating and other altered skin reactions, and by interferences with digestion. Here we may place the altered endocrine functions that affect muscular tone and maintain some of the symptoms and signs of the effort syndrome. The word "neurosis" may perhaps be properly applied to these changes at the lower levels of the nervous system, though they cannot be separated from the psychoneuroses as regards either cause or treatment.

If the psychoneuroses are accepted as due to repressions, then treatment should be directed to bringing the repressed memories into consciousness. It is beyond my present purpose to discuss how this can be done, but the effect upon the heart of treatment

directed towards the underlying condition is illustrated by a man who suffered from a severe anxiety state and had a pulse-rate of 160 (taken, it is true, during an examination by a pensions board) with the usual symptoms of the effort syndrome. He had a loss of memory for almost every emotional experience during two and a half years of fighting, and as the memories were revived with due emotional expression his pulse became less frequent and after nine interviews reached and remained at the rate of 76 per minute; his other symptoms showed a corresponding improvement.

On p. 23 of the Report is described a severe fainting fit in a young man who presented "the characteristic signs of toxic debility." The fit resembled closely those in a patient of mine whose frequent "heart attacks" were so alarming that he was placed upon the "dangerously ill" list; the attacks ceased after the revival of the one incident which they symbolised and which had been completely forgotten. Syncopal attacks in patients with repressed war experiences (and these patients include most of those who were subjected to the stress of actual warfare) can often be traced to definite repressions, as in the last example, and are benefited by their revival. Long-standing conditions, aggravated or not by army experience, present greater difficulties, and it is not practicable to treat by methods of mental exploration any large number of them. Even in these a recognition and explanation of the real condition is preferable to allowing the patient to go through life with a belief in the organic cause of his symptoms.

The question may be raised whether the symptoms in valvular cases are sometimes due to an anxiety condition; such a hypothesis would satisfy the problem raised in the Report in regard to the onset of symptoms after shell shock in patients with pre-existing valvular lesions. The existence of a symptomless and unsuspected organic lesion would not protect a man from a psychoneurosis, and the cardiac symptoms that arise would be attributed to the lesion, though they may be in no way related to it.

The possibility of other combinations must be considered. There may be a group of cases in which dyspnœa, cardiac pain, and palpitation persist indefinitely and depend upon physical causes, although no signs of heart or lung disease ever become manifest; there are certainly cases in which those symptoms are the first indications of organic disease; an anxiety state may exist in addition, just as it may in combination with other diseases. But the majority of cases found amongst pensioners and diagnosed D.A.H. are entirely of psychogenetic origin. If this fact could be generally recognised it would aid in the restoration to social usefulness of some of the men who now regard themselves as permanent invalids.

SYMBIOTIC GROWTH OF B. PROTEUS AND B. TUBERCULOSIS.

APPEARANCE OF AN ACNE-LIKE ORGANISM.

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(*With a Note by* R. A. O'BRIEN, M.D.)

SOME years ago I commenced a series of experiments bearing on the symbiotic growth of organisms in the mass of bacterial growth in the intestine. A five months' glycerine-veal broth culture of *B. tuberculosis* (bovine) was inoculated with a laboratory strain of *B. proteus vulgaris*. The proteus grew quite luxuriantly and no change in the morphological characters of the organisms could be observed on the seventh day. On the twelfth day a marked yeast-like odour was noticed on opening the incubator, and, on microscopical examination of the mixture, it was found to be crowded with a diphtheroid organism. Nothing further was done with this mixture as I presumed that the presence of this third organism was possibly the result of a contamination.

A repeat experiment was performed, using every precaution against contamination. Four strains of *B. tuberculosis hominis* and one strain of *B. tuberculosis* (bovine) were grown on large tubes of glycerine-brain agar for one month, after which time sufficient glycerine-veal broth was added to cover the growth, and inoculated with *B. proteus*. In all the mixtures the diphtheroid organism described in the first experiment was observed at the end of ten days. The yeast-like odour is apparently characteristic of this remarkable phenomenon, as it was noticed in all the tubes. Furthermore, the dense turbidity due to the growth of *B. proteus* had disappeared on the formation of this new organism. Subcultures made on surface agar showed no growth at the end of seven days, the proteus having died out. In stab glucose-agar, inoculated from the mixture, a growth was observed at the end of three days, which was strictly anaerobic. The growth was a compact one, starting about half way from the surface of the glucose-agar. On microscopic examination it was found to be the diphtheroid organism observed in the mixtures.

Morphologically and culturally this organism is identical with the acne bacillus.

With subsequent experiment it was found that the evolution of this organism was not constant, and up to the beginning of 1914 97 experiments with tubercle had been performed under varying conditions in order to determine the most suitable conditions under which the phenomenon occurred. 62 per cent. of the experiments were positive and the most favourable conditions seemed to be glycerine-veal brain agar cultures of tubercle to which 5 per cent. glycerine-peptone water to cover growth had been added. Temperature 37° C. The evolution of this organism has occurred in every strain of tubercle which has been subjected to this treatment at different times both in culture and in tissue—i.e., seven strains of human, six strains of bovine, one strain of avian, and one strain of piscian *B. tuberculosis* in culture. Three experiments were performed with tuberculous tissue; two were positive and one suspicious.

Experiments were carried out on organisms more or less allied to *B. tuberculosis* with positive results—i.e., *Streptothrix actinomyces*, *Str. birt* and *leishman*, the bacillus of Johne, and one of three strains of acid-fast bacilli isolated by Tobler.

A few animals (guinea-pigs and mice) were inoculated by Dr. O'Brien with living cultures of the new organism isolated from the tubercle + proteus mixtures, but the results were variable. The animals were killed and a diphtheroid was generally found in some of the organs. Exhaustive controls were carried out on all the organisms under experimentation in order to eliminate, as far as possible, any suspicious members of the group. The cultures were observed under aerobic and anaerobic conditions with and without the addition of glycerine-peptone water.

The work had not proceeded far when the proteus was started from a single organism by the capillary tube method. Many organisms remote from the tubercle group were grown in symbiosis with proteus, but in none of these, or other controls, did the evolution of this diphtheroid occur. The morphological characters of the organism varied from the almost coccoid diphtheroid to the long, club-shaped forms one sees in old broth cultures of *B. diphtheriæ*; this was especially noticeable with the organism isolated from the actinomyces + proteus mixture.

Repeated Experiments.

At this time several factors over which I had no control, and later the outbreak of war, prevented further work in connexion with the subject until quite recently, when I determined to repeat some of the experiments with the cultures to hand in my own laboratory. All the cultures in this later experiment were from other sources than those used at the Wellcome Physiological Research Laboratories. One strain each of *B. tuberculosis*, human and bovine, actinomyces bovine, a streptothrix isolated from a case at Westminster Hospital, and *B. smegmatis* were grown on glycerine-brain agar, the growth, covered with 5 per cent. glycerine-peptone water, and inoculated with *B. proteus*. In every tube the diphtheroid organism was observed in from 7 to 14 days.

The object of this paper is simply to place on record the work which has been done, together with the

results, without comment, as it would be premature to draw definite conclusions with such meagre data on a matter of such great complexity. However, in view of the last results there is justification in assuming that the appearance of this third organism is not due to a contamination, and that it strengthens the theories, so often hinted at throughout bacteriological literature, that the acid-fast organisms and the streptothrices are closely related, and that at certain phases of their existence no sharp line of demarcation exists.

My thanks are due to Dr. H. J. Südmersen, Dr. O'Brien, and Mr. A. T. Glenny, of the Wellcome Physiological Research Laboratories, and to Professor R. T. Hewlett for their help and practical interest in this work.

NOTE ON MIXED CULTURES.

BY R. A. O'BRIEN, M.D.,

WELLCOME PHYSIOLOGICAL RESEARCH LABORATORIES.

Several years before the war Mr. Thompson stated that while working as chief bacteriological assistant in these laboratories, he had inoculated cultures of *B. tuberculosis* with *B. proteus*, and that an acne-like organism had appeared in the tubes after the death of the *B. proteus*.

I was asked to investigate the matter, and made some mixed cultures. The phenomena described by Mr. Thompson occurred in one of the tubes of an early series. Several weeks after the mixed culture was made the *B. proteus* could no longer be recovered by subcultures, and there were present in large quantities strictly anaerobic bacilli which were Gram-positive, not acid-fast, and, morphologically, closely resembled the acne bacillus. I made several hundred experiments with different strains of *B. tuberculosis*, using cultures of *B. proteus* plated many times, and also a culture obtained from what appeared under the microscope to be a single *B. proteus*. In three of these experiments the second anaerobe made its appearance. Every ordinary bacteriological precaution to eliminate the possibility of contamination was used; the anaerobe could not be seen in smears made either from the separate cultures of *B. proteus* or *B. tuberculosis*, or from mixed cultures during the first week of incubation.

This anaerobe is practically unknown as a contamination in the multitude of cultures and sterility tests made in these laboratories in connexion with other work. Pure cultures of the anaerobes were injected into small animals; these remained healthy and were eventually killed. I was not satisfied that any pathological changes were present, though the bacillus was found aggregated in some of the glands and organs. Large doses of the organisms were injected into several guinea-pigs. It was not possible to demonstrate any alteration of resistance to infection by cultures of *B. tuberculosis*, which were subsequently injected.

The anaerobe never appeared in my cultures of *B. proteus* with various Gram-negative organisms, nor in those containing *B. tuberculosis* and Gram-negative organisms other than *B. proteus*.

Neither Mr. Thompson nor I could arrange the conditions of the cultures so as to ensure the appearance of this organism in every experiment. The results were very irregular, some series of many tubes failing entirely to give the results sought for. It was felt that it would be undesirable to publish these results unless one could describe the conditions with sufficient accuracy to enable the experiments to be checked by other workers. With the hope of being able, eventually, to control the conditions, the work was continued as opportunity offered, until the war stopped it. Mr. Thompson has now left these laboratories, and wished to publish the preceding note.

The change from the aerobic acid-fast organism to the anaerobic non-acid-fast Gram-positive one appears to be so opposed to the whole of general experience that one naturally inclines strongly to the assumption that the organism was a contamination. Yet the organism has never been found as a contamination in thousands of sterility and other tests made here in the course of many years, and it made its appearance despite every ordinary bacteriological precaution against contamination.

Medical Societies.

ROYAL SOCIETY OF MEDICINE.

LARYNGOLOGICAL CONGRESS.

THE second Summer Congress held by the Section of Laryngology took place on June 24th and 25th under the chairmanship of Mr. MARK HOVELL, and was in every way a success. A valuable aspect of the Congress was the full discussion of subjects intimately associated with the specialty—such as "Cancer of the Throat"—which the ordinary clinical meetings only incidentally raise in connexion with particular patients and specimens. Important addenda were a museum of pathological drawings and specimens (which was kept open for a week) and an exhibition of surgical instruments and drugs. There were a number of American and European visitors at the meetings.

Sir CHARTERS SYMONDS read a paper on Total Laryngectomy, in which he dealt in detail with the indications for operation, the special dangers, and how they could be met. He laid particular emphasis on the after-treatment, designed to ensure the greatest possible comfort to the patient and his participation, as fully as might be, in active pursuits. If the patient could breathe sufficiently well to carry him through the operation the speaker dispensed with preliminary tracheotomy. He showed two patients who were able to make themselves clearly heard years after the operation.

Sir ROBERT WOODS (Dublin) gave his experience in 25 cases, and described the after-treatment. Drainage of the pharynx afterwards he regarded as very important. He preferred total laryngectomy to attempts to get the growth away by median thyrotomy.

Sir WILLIAM MILLIGAN did not do tracheotomy beforehand unless it was urgently needed. He laid special stress on a thorough examination of the region with the œsophagoscope before deciding on the operation, as it was sometimes found in this way that the growth had a much greater extension downwards than had been suspected. The difficult part of the operation was the suturing of the mucous membrane of the pharynx.

Dr. F. LEMAÎTRE (Paris) favoured tracheotomy 14 days before the major operation in these cases. He used local anæsthesia.

Sir JAMES DUNDAS GRANT pointed out the type of cases in which simple thyrotomy sufficed for the removal of the malignant disease, and expressed the hope that this operation would retain its place for suitable cases.

Dr. J. J. KILLEEN (Chicago) said the results in the kind of cases under discussion which he had seen in America, where they were usually dealt with by the general surgeon, were very poor. There was now a growing tendency to refer them to the specialist, especially in New York.

Dr. IRWIN MOORE said that 30 years ago of 163 cases 41 per cent. died from the operation and 28 per cent. more were dead within a year.

Mr. WILFRED TROTTER discussed a measure of pharyngotomy for the exposure of large growths of the epilaryngeal region; it consisted of a minute examination of the various routes and their suitability in particular cases. The contribution was fully discussed, and Mr. Trotter further elaborated his methods in his reply.

Dr. LOGAN TURNER gave a series of illustrations of carcinoma of the post-cricoid region and upper end of the œsophagus, and submitted tables of sex incidence and age of onset. He also dealt with the symptoms according to the situation of the growth.

Mr. E. D. DAVIS read a paper on the Early Diagnosis of Carcinoma of the Oral and Laryngeal Pharynx, in which he drew attention to the value of a direct examination, either by suspension laryngoscopy or by means of the œsophagoscope.

Sir STCLAIR THOMSON followed with a contribution on the Significance of Impaired Mobility of the Cord in the Diagnosis and Prognosis of Intrinsic Laryngeal Cancer, which appears this week in our original columns.

Dr. A. BROWN KELLY read a paper on Œsophageal Obstruction due to Hypertrophy of the Cardiac Sphincter, with details of a case.

Sir WILLIAM MILLIGAN contributed a paper on the Removal of Foreign Bodies which became Impacted in the Food- and Air-passages, based on a large personal experience. He emphasised the importance of coöperation in these cases between the laryngologist and the radiologist, though a negative statement by the latter should not necessarily be accepted as conclusive.

Dr. P. WATSON-WILLIAMS entered into the question of Latent Sinusitis in Children, the symptoms of which were essentially similar to those of infected tonsils and adenoids, chiefly recurrent nasal catarrh, buccal respiration, catarrhal deafness, aprosexia, mental backwardness, and chronic sepsis. He described the methods of examination in arriving at a diagnosis and gave full details of an illustrative case.

Mr. H. LAWSON WHALE submitted a short thesis on Per-nasal Dacryocystostomy, showing the importance of attacking the sac itself, not the nasal duct. Acute empyema he regarded as a contra-indication of the operation. In his 25 cases, 63 per cent. were cured, and 12 per cent. partially so.

Dr. IRWIN MOORE'S paper on Angeiomata of the Larynx consisted of a summary, in easily referable form, of all the recorded cases.

Mr. W. M. MOLLISON'S concluding paper dealt with tonsillar infection as a source of various systemic and other diseases, such as endocarditis, myocarditis, rheumatoid arthritis, fibrositis, myositis, and "neuritis," also such skin affections as alopecia areata, lupus erythematosus, and psoriasis. In all the cases examined a streptococcus was found. About 80 per cent. of the cases treated by tonsillectomy were cured, and the remainder were left in statu quo.

On Friday afternoon a series of demonstrations were given, and in the evening the usual clinical meeting took place, when many patients were shown and their conditions discussed.

Reviews and Notices of Books.

SURGICAL SHOCK AND THE SHOCKLESS OPERATION THROUGH ANOCI-ASSOCIATION.

Second edition. By G. W. CRILE, Professor of Surgery, Western Reserve University, &c.; and W. E. LOWER, Associate Professor of Genito-Urinary Surgery, Western Reserve University. London and Philadelphia: W. B. Saunders Company. 1920. Pp. 272. 21*s*.

THIS book has been entirely revised, rewritten, and brought up to date in the light of war experience. The authors have aimed at presenting concisely the principles and practice of anoci-association methods, which they now designate by the term anociation; they do not discuss the various theories of shock, but merely state dogmatically their own position. The book contains a large amount of excellent advice on surgical technique, including many hints on the conduct of special operations derived from the authors' own abundant experience. The authors may justly speak with authority on the technique of avoiding post-operative shock by reduction of trauma, a method which will always be associated with the name of Crile. They advocate dissection by the knife rather than with blunt instruments, and emphasise the importance of avoiding psychical strain; treatment by blood transfusion is described in detail. Convincing statistics are given to show the superiority of nitrous oxide and oxygen anæsthesia over all others in serious cases, especially when combined with regional infiltration with novocaine.

The authors explain their results on Crile's kinetic theory of shock, attributing all the phenomena to exhaustion following attempts on the part of the organism to escape from nocuous influences; they assume an intracellular acidosis, but their theories are often strangely inconsistent. They consider nitrous oxide anæsthesia a partial substitute for sleep, and yet find that, in the worst cases of exophthalmic goitre, it is best to keep it so light that analgesia alone is caused without loss of consciousness. Assuming that nitrous oxide acts by interfering with the use of oxygen by the brain cells, they argue that the formation of acid substances in the brain is thus prevented; it is not clear why the opposite should not be the truer deduction. A crossed circulation experiment is reported in which the only proof of the occurrence of shock in either animal seems to have been the finding of certain histological differences in the nerve cells, these changes being themselves controversial. The result obtained would normally be expected from the experiment, even if these changes had nothing to do with the cause of shock. The photo-micrographs intended to demonstrate the cell-exhausting theory are not very convincing.

According to these authors "shock is a loose and unscientific term. We realise that it might well be dispensed with and the word exhaustion substituted." This is mostly true of shock as described in this book, but is by no means true of all shock. The term exhaustion might well be used for the post-operative reaction, which is largely of this origin, so as clearly to distinguish it from other conditions, such as the surgical shock of immediate onset after a severe injury, so often seen on the battlefield.

So well does Dr. Crile put his theories into practice that to anyone who has seen his wonderfully clean knife-work and bloodless surgery, and Miss Hodgins's excellent anæsthesia, the absence of post-operative reactions in his patients seems only natural. Whatever theory of shock may be held, this joint production is a valuable book, with which all surgeons should make themselves familiar.

DER KROPF DER WEISSEN RATTE.

Beitrag zur vergleichenden Kropf-forschung. Von Prof. Dr. Th. LANGHANS and Prof. Dr. C. WEGELIN. Berne: Paul Haupt. 1919. Pp. 131. Fr.14.

THIS small volume, published from the Pathological Institute of the University of Berne, and carrying on its title page the name of the late Professor Langhans as part author, is a report of experiments instituted in 1911–13 by the Swiss Goitre Commission. The experiments were designed more particularly to test Bircher's hypothesis that the endemic occurrence of goitre is associated with definite geological formations, and that goitre is due to some toxic substance derived from such geological formations introduced into the body in the drinking water. Bircher claimed that it was possible to produce goitre experimentally in white rats, monkeys, and dogs by supplying them with water from certain districts.

The present report consists chiefly of a detailed histological description of the thyroids of about 120 rats which had been kept in different localities in Switzerland on similar diets but different water. The results show that the drinking-water hypothesis cannot be accepted as an adequate explanation of the ætiology of endemic goitre, and that it is even doubtful whether it has any connexion therewith. In one district (Kazis), where goitre is endemic, the six rats receiving the local water all developed a typical goitre; but unfortunately for the hypothesis 10 of the 11 control rats which had received milk instead of water also developed goitre. Again, a series of rats kept by Kocher in Berne, and supplied with water from a certain district, showed marked goitrous changes in the thyroid; but another series kept in a different institute and receiving the same water showed hardly any changes at all. It is interesting to note that Bircher's hypothesis has also been tested recently in the Argentine, where goitre is endemic in certain regions. A recent volume of the "Revista del Istituto

Bacteriologico"[1] contains a paper by Wernicke, in which he dismisses Bircher's hypothesis as untenable. It would appear, therefore, that the drinking-water hypothesis must be relegated to the limbo of ingenious speculations which have had the misfortune of not fitting in with the facts.

The authors review critically the various hypotheses which have been put forward to explain the condition, and very cautiously—caution like goitre seems to be endemic in hilly countries—they refuse to accept any of them and suggest that more than one factor is concerned in the ætiology of endemic goitre, while commenting on the certainty with which potassium iodide in minimal quantities prevents it. One naturally reads with special interest their reference to McCarrison's work. They criticise his conclusions on the ground that feeding with fæces has in the hands of other workers failed to produce goitre. That criticism is not very convincing, since the bacterial flora in the intestine is a variable factor and is greatly influenced by the diet. They admit that the therapeutic results of intestinal antiseptics are a strong confirmation of McCarrison's views. In an appendix they deal with the contention of Chagas that the endemic goitre of Brazil is due to an infection with *Trypanosoma cruzi*. Rabbits and guinea-pigs infected with these trypanosomes showed no changes in their thyroid glands. The special form of goitre described by Chagas is probably an endemic goitre complicated by a superimposed trypanosome infection.

This careful and painstaking investigation is illustrated by numerous figures and supplied with a full reference to the literature of the experimental production of goitre. It seems a pity that no observations were made on the suprarenal glands of the goitrous animals. The testes, ovaries, pituitary and parathyroid glands are stated to show no abnormalities, but none of these organs are functionally as closely related to the thyroid as is the suprarenal gland.

THE SYSTEMATIC TREATMENT OF GONORRHŒA IN THE MALE.

Second edition. By NORMAN LUMB, O.B.E., M.B., B.S. London: H. K. Lewis and Co., Ltd. 1920. Pp. 123. 5*s*.

IN this second edition of a work published first in 1917 the author has included recent developments and improvements in diagnosis and treatment. The length of the work has not been increased, and its original object—that of providing a small volume for the use of students and practitioners—has not been lost sight of. The book aims especially at being a practical exposition of methods of treatment and diagnosis. It is clearly written, concise, and in many ways a serviceable work.

SYPHILIS DE L'UTÉRUS ET DE SES ANNEXES.

By Dr. E. OZENNE. Paris: Masson et Cie. 1920. Pp. 226. Fr.12.

Dr. Ozenne has undoubtedly furnished his readers with more information concerning syphilis of the female genitalia than has any previous writer on this subject. The book is packed with observations, and the subject is treated with a completeness that will appeal to the syphilologist rather than to the general practitioner of medicine.

The author believes that syphilitic lesions of the cervix, the uterus, and its appendages occur with greater frequency than is generally recognised. For this reason he devotes a great deal of his work to the question of differential diagnosis. Diagnosis is, indeed, the chief difficulty, for the syphilitic nature of these lesions is by no means obvious, and it is only by a very careful consideration of all the facts of the case that a correct conclusion can be reached. Where statistics of the frequency of occurrence of the various manifestations of syphilis are available the author has furnished them. Such statistics, however, do little but emphasise the great discrepancies existing in the observations of different authorities. For instance, the percentage of cases of primary chancre of the cervix is put by one authority at 0·53 per cent. of all cases of genital chancre, and by another (Newman) at 15 per cent. Moreover, after a careful consideration of the literature of the subject and of his own personal observations, the author has arrived at the opinion that the uterus and its appendages are much more liable to syphilitic infection than is usually supposed. Part I. of the work deals entirely with syphilis of the uterus. Part II. is devoted to syphilis of the tubes, the ovaries, and the mammary glands. The author, whilst admitting the value of the Wassermann reaction, rightly insists on the necessity of regarding this test as an adjunct rather than as the chief step in diagnosis. Great stress is laid on the value of clinical observation. The appearance of the various syphilitic lesions is accurately described and carefully contrasted with that presented by infections of a non-syphilitic nature. The omission of illustrations—doubtless for reasons of economy—is regrettable. A few plates would have been welcome, since long descriptions of pathological lesions are somewhat tedious. However, the work is a monument to the care and thoroughness with which the writer has studied his subject, and is the most complete existing work on this branch of syphilography.

[1] Buenos Aires, vol. ii., No. 3, October, 1919.

SYPHILIS.

By K. K. CHATTERJI, F.R.C.S. Irel. London and Calcutta: Butterworth and Co. 1920. With numerous illustrations and coloured plates. Pp. 382. Rs.15.

THIS work by Mr. Chatterji, surgeon and dermatologist to the Campbell Hospital, Calcutta, is entirely an Indian production, being illustrated by an Indian artist and published by an Indian firm. The author has collected a large amount of information on the subject of syphilis, and evidently possesses a very extensive knowledge of European literature. The addition of his own observations in India provides a book of especial value as a record of syphilis modified by a tropical climate. The author is the originator of the margosate precipitation tests for syphilis. Sodium margosate is a derivative of margosa oil, prepared from the nim tree, and when added to an emulsion of washed red blood cells causes hæmolysis. The addition of normal serum to the mixture interferes with its hæmolytic action; moreover, the author has found that hæmolysis occurs with a greater dilution of margosate when syphilitic corpuscles are used than when the corpuscles are healthy, and a simple test is thus available. The author has also employed the margosates as therapeutic agents. The products of the nim tree have long been used in India in the treatment of skin diseases, notably syphilis and leprosy. The author has investigated the properties of margosa oil along scientific lines and has evolved a treatment based on a derivative of margosa oil from which he claims to have obtained satisfactory results. This treatment may be used in conjunction with salvarsan and mercury, and has already been discussed by Mr. Chatterji in the *Indian Journal of Medical Research*.

The pathology of syphilis is fully discussed in this volume, and the interpretation of the Wassermann reaction receives special notice. With regard to malaria, Mr. Chatterji concludes that if three weeks or more have elapsed since active manifestation of malarial infection a positive Wassermann may be regarded as evidence in favour of syphilis. Treatment occupies a very large portion of the book, and the author's conclusions are in harmony with those arrived at by the majority of European observers.

Altogether, Mr. Chatterji has produced a clearly written and well-arranged text-book on syphilis that may well become a standard work on the subject at Indian universities.

PSYCHOLOGIES.

By Sir RONALD ROSS. London: John Murray. 1920. Pp. 69. 2*s*. 6*d*. THE REVELS OF ORSERA. Same author and publisher. 1920. Pp. 393. 7*s*.

Sir Ronald Ross has an established reputation among modern poets, and this collection of five short dramatic

pieces will further enhance it. In many respects these poems show a distinct advance on his "Philosophies." While there is the same wealth of imagery, a greater restraint in expression increases rather than diminishes their power. The quality of the verse is, as a rule, well maintained, but occasional weak lines occur, often with unfortunate effects.

In "The Revels of Orsera" Sir Ronald Ross shows versatility. This romance of the Middle Ages deals with the supernatural, and is based on ancient records. It contains some fine descriptive passages, and gives evidence of much historical research.

A TEXT-BOOK OF PHYSIOLOGY.

For Students and Practitioners of Medicine. By RUSSELL BURTON-OPITZ, S.M., M.D., Ph.D., Associate Professor of Physiology, Columbia University. London and Philadelphia: W. B. Saunders Company. 1920. Illustrated with 538 figures. Pp. 1185. 32*s*. 6*d*.

THIS work invades the fields of comparative physiology, physics, chemistry, and histology no farther than appears to the author absolutely necessary, for Dr. Burton-Opitz considers that the sole hope of modern medicine lies in physiology or, in a larger sense, the experimental sciences. "Since it may, therefore, be contended that 'medicine is physiology,' the student should make a conscientious effort to become thoroughly acquainted with this subject." We may say at once that the author has made a sustained and, on the whole, a successful attempt to enable the conscientious student of medicine to meet the high claim made for physiology. Diagrams and simple sketches form a feature of the book; some are original and others modifications of earlier sketches. A few of them might, we think, be improved, but the great majority of the diagrams are most helpful. It is unfortunate that such a large number of printer's errors should have crept into the spelling of authors' names.

There are one or two curious statements. "It was Cl. Bernard who first called attention to the fact that the occlusion of the duct of Wirsung produces a complete atrophy of the acini of the pancreas, but does not destroy the islets of Langerhans." (The activities of Bernard had ceased long before the discovery of the islets of Langerhans.) "Like saliva, gastric juice is secreted continuously, but only in amounts sufficient to lubricate the mucous surfaces." Amongst omissions—perhaps deliberate—are the subjects of progression in general, walking, running, and allied movements. We only point out a few shortcomings in order that greater control be exercised in the next edition. In one important respect—the introduction of certain historical data—this work is a marked improvement on most of the physiological text-books we have been called on to review recently.

The excellence and comprehensiveness of the text immeasurably outweigh its defects. The balance of the several subjects dealt with is well maintained and an adequate account of function is given in each section of a compendious, well-illustrated, and readable text-book.

ESSENTIALS OF HUMAN PHYSIOLOGY.

Fifth edition, revised and enlarged. By D. NOËL PATON, M.D., LL.D., F.R.S., Professor of Physiology, University of Glasgow. Edinburgh: W. Green and Son, Ltd. 1920. Pp. 679. 25*s*.

WRITTEN expressly for students of medicine and surgery by an experienced physiologist who has also had experience in teaching and practising these arts, this work has been enlarged, revised, and in part rearranged to secure a more logical sequence and greater prominence for those subjects which bear directly upon medical and surgical practice. This edition is in many respects a great improvement on its predecessors. The author need hardly apologise for allowing the names of investigators to appear frequently in his pages. On the contrary, there are a few classic names we would have gladly welcomed, notably that of Bichat in the section on tissues. The date of each discovery would have been useful, since Mariotte's experiment, Purkinje's figures, and Dr. Beaumont's fundamental observations on Alexis St. Martin form significant landmarks. Nor need the author be concerned about omitting the terminal *e* from the names of amido-acids and other similar compounds, when on one page appear side by side katalysers and catalysers, katalytic and catalytic actions. Again, while prominence is given on p. 76 to the methods of Marchi and Weigert, we failed to find the classic term "Wallerian degeneration," although it occurs in the index. Frauenhofer (p. 167) is obviously a misprint for Fraunhofer, as is Clark's vesicular column for Clarke's (p. 118). Perhaps in referring to the theories of colour-blindness the names of Young, Helmholtz, and Hering might have been introduced, more especially as Wrightson and Helmholtz are mentioned in connexion with the theories of the action of the cochlea. These, however, are small matters.

In the section on physiology of muscle we read with pleasure the explanation of the true relationship between oxidation and muscular contraction. Contraction is not due to oxidation, but to the throwing out of sarcolactic acid—that is, to an increase of H ions, which produce changes in surface-tension with the development of "tension." Muscle in contracting thus acts not as a heat engine which liberates energy by combustion, but as a compression engine which liberates energy already stored. The subject of food is admirably expounded, especially the arguments in favour of a liberal protein intake (p. 307). On the thorny question of accessory food factors, notably fat-soluble A, Professor Paton refers to the absence of this factor "as causing not only an arrest of growth, but also a peculiar inflammation round the eyes"—presumably xerophthalmia. Of rickets he says, "the cause of the disease is still unknown." The chapters on the circulation have undergone very material improvement. A figure of the heart-lung preparation of Starling is introduced and the great physiological value of this method is expounded. The recent work on the volume, pressure, and transfusion of blood is dealt with in detail, and its bearing on the theory and treatment of shock.

We notice many additions and improvements in the treatment of the subject of respiration, and also of the complex problems that surround the secretion of urine. The information on chemical regulation of growth and function is particularly good, more especially with reference to structures with internal secretions called by the author "endocrinetes." He regards the name of hormones as unsuitable and prefers "thyreoid" to "thyroid," "neurolemma" to "neurilemma."

We feel sure that this lucid survey of the essentials of physiology and their practical application to medicine will prove an attractive and instructive exposition to the thoughtful student of medicine.

DODI VE-NECHDI (UNCLE AND NEPHEW).

By BERACHYA HANAKDAN. Edited from MSS. at Munich and Oxford, with an English translation, introduction, &c., to which is added the first English translation from the Latin of Adelard of Bath's Quaestiones Naturales. By HERMANN GOLLANCZ, M.A., D.Litt. Oxford: Humphrey Milford. 1920. Pp. 161–160. 21*s*.

ONE of the characteristics of the Middle Ages was a passion for knowledge as exemplified in the rise of universities, in the wanderings of scholars not only over Europe but to the East, and in the labours of translators, the school of Gondisapor, and the literary output of men such as Michael Scott and Gerard of Cremona. English readers owe a debt of gratitude to Dr. Gollancz for having made accessible to them the two works now before us, the one a treatise by a learned French rabbi, by name Berachya, and the other a work now for the first time translated into English from the Latin, by Adelard of Bath, of which Berachya's treatise is a paraphrase or adaptation. Both are cast in the form of a dialogue between an uncle and a nephew, and are of great interest as showing the views of our mediæval forefathers on various questions in natural philosophy,

although the answers do not always elucidate the questions. For instance, Berachya's nephew asked why he could hear but not see through a wall. He was told "that sound, which is air, passes through pores which are not visible," but "the eye has power to see the wall as the light of the sun shines upon it, but it cannot see through the wall."

One question interpolated between Q. XX. and Q. XXI. of the Munich MS., which corresponds to Q. XVI. of Adelard, throws an interesting light on the process of early dissections. Adelard says: "When philosophers thought it of importance to investigate the systems of sinews and veins ..... they fastened, no doubt, a human corpse in a river, and kept it exposed to the current until all the skin and flesh had fallen off, while the sinews and veins, which are of stouter material, were left behind. Such was the way in which the contexture was made clear to them."

Another problem discussed is, "Why the sea is salt." Berachya and Adelard both give the not very convincing reason that the sea, being much exposed to the sun's rays, becomes salt by reason of the heat. As a proof, those who live near the sea will tell you that salt is found as the residue of the water on rocks which are exposed to the sun. The saltness of the sea was a great puzzle to our forefathers, and in Felix Fabri's delightful "Evagatorium" a long dissertation on the matter will be found.[1] He gives various opinions, but adds that the ancient philosophers erred. He quotes with approval a passage from the "Speculum Naturale," wherein the author explains that the sea water is salt because the water contracts divers qualities from the earth.

There is an interesting point of physical geography discussed in Q. VII. of the Munich MS., in 33 of the Bodleian and C. LIII. of Adelard—namely, why the inflow of the rivers does not increase the size of the ocean—and in all three places the answer is that the water gets back from the sea to the land by subterranean ways, and gets purged of its salt on the way. Adelard probably took this answer from Seneca, Quaest. Nat., but the same theory is found in Lucretius, V., 261, and VI., 608 et seq. Mr. Warde Fowler has used these passages in his usual charming manner to write a most illuminating note on Aeneid, VII., 31 to 80, concerning Virgil's idea of a great underground water system (see his "Aeneas at the Site of Rome," p. 37).

It appears from Dr. Gollancz's learned introduction to his translation of Berachya's other work, "The Ethical Treatises," that Berachya was a French Rabbi who flourished about A.D. 1160, but scholars are by no means agreed either as to the date of Berachya or as to his identity. Neubauer, for instance, says that "we must accept the existence of two Berachyas, or possibly of three." The questions both in "Uncle and Nephew" and in Adelard's treatise are not generally concerned with medical matters, but there is one question in Berachya[2] which puts forward the problem, "Why does a healthy man become infected when he lies with a woman with whom a diseased person had been lying, whilst the woman herself with whom this diseased one had been lying is immune from infection?" Adelard in his version limits the infection to leprosy, but it is possible that Berachya's version may refer to venereal disease properly so-called, and so be some evidence for the existence of syphilis in Europe anterior to the generally accepted date.

HANDBOOK OF DISEASES OF THE RECTUM.

Third edition. By LOUIS J. HIRSCHMAN, M.D., F.A.C.S., Professor of Proctology, Detroit College of Medicine. London: Henry Kimpton. 1920. Pp. 378. 30*s*.

THE author states, in the preface to the first edition, that his aim has been to produce a working handbook for the assistance of the general practitioner in the diagnosis and treatment of ano-rectal diseases. "Only those conditions which are amenable to treatment in office practice have been discussed." The author is an enthusiast in the field of local anæsthesia, and the operative treatment of hæmorrhoids and fistula without general anæsthesia is fully described. The subject of carcinoma of the rectum does not come within the scope of this work, but the importance of early examination in all cases of hæmorrhage from the rectum is emphasised. In the present edition the text has been revised and more illustrations have been added.

Clear accounts are given of all methods of investigation used in cases of rectal disease, and special emphasis is laid on practical details which may save the patient from discomfort and from the necessity of prolonged confinement to bed. There is a good chapter dealing with the technique of local anæsthesia; the author finds ½ per cent. solution of quinine and urea hydrochloride most generally useful. The chapter on "Constipation and Obstipation" seems rather out of place in a book of this sort and is necessarily incomplete. Most of the illustrations are good, though some seem unnecessary, as, for instance, the figure showing how to apply a lubricant to the finger.

Judged by the standard laid down by the author in his preface the book is a success.

CRISES.

By MAURICE LEVEL. Translated by ALYS EYRE MACKLIN. London: Erskine Macdonald. 1920. Pp. 239. 6*s*.

THESE tales of mystery and horror are translated from the French of Maurice Level, and in their original form attracted considerable attention in a well-known French newspaper. Those who read them in that form may recall the particular feeling of suspense, of pity, or of nausea which they evoked, but in their English shape it is not very probable that they will have the same appeal. The intent to thrill, soften, or sicken the reader remains obvious, but in our opinion it will generally miscarry. The little stories would have had more chance if they had reached the reader without an introduction and a prefatory note by the translator, in each of which too much is protested. Granted that M. Level employs the methods of O. Henry, this does not substantiate any right to a comparison with Edgar Allen Poe. In the French form the terseness of the work may give it an artistic claim which it lacks in the translation, but in their English garb the stories lack the sense of mystery and horror which the translator's subtitle attributes to them, and it is just that sense which makes Poe absorbing, even when he is most preposterous. Perhaps M. Level's stories "bear a closer relation to life" than Poe's, but that is quite another point; they are certainly not "more concentrated in their horror." They are, as a matter of fact, machine-made stories of the fat-boy order, and suffer, as collections of stories written on the same recipe must always suffer, from the monotonous effect produced. The first story is the best in the book.

DISEASES OF THE CHEST AND THE PRINCIPLES OF PHYSICAL DIAGNOSIS.

Second edition, revised. By GEORGE WILLIAM NORRIS, A.B., M.D., and HENRY R. M. LANDIS, A.B., M.D., Assistant Professors of Medicine in the University of Pennsylvania. With a chapter on the Electrocardiograph in Heart Disease, by EDWARD B. KRUMBHAAR, Ph.D., M.D., Assistant Professor of Research Medicine in the University of Pennsylvania. London and Philadelphia: W. B. Saunders Company. 1920. Pp. 844. 35*s*.

IT is less than two years since the publication of the first edition of Professor Norris and Professor Landis's book. Certain articles in the present issue have been recast, and there have been added descriptions of several conditions previously omitted. These include such subjects as influenza, streptococcal empyema, spirochætal bronchitis, calcification of the lungs, chronic inflammatory conditions of the lungs of uncertain ætiology, and pneumopericardium. The book does not concern itself with treatment; its chief aim is to serve as a guide to the physical diagnosis of diseases of the heart and

[1] Vol. i., Ed. Hasler, 1843.
[2] Munich Cod. xlii., Bodleian MS. 26, Adelard xlii.

lungs. The authors rightly insist that it is only through a comprehension of the laws governing the production and transmission of sound that the results of percussion and auscultation can be intelligently interpreted, and they devote the first 260 pages to the examination of the lungs and circulatory system, the subject of diagnostic acoustics being treated at greater length than is usual in books of this character. In the main this section of the work is in accordance with scientific principles and leaves little to be desired. Another feature calling for comment is the lavish provision of photographs of frozen sections from the cadaver previously hardened in formalin, so that the anatomical relations of the organs are preserved as in life.

In the later portions of the book dealing with morbid conditions of the heart and lungs no less than 15 clinical varieties of pneumonia receive notice, and this is a fair example of the very thorough manner in which the authors have carried out their task. They appear to take the view that influenza is primarily attributable to Pfeiffer's bacillus, but that in a very large number of cases the bacillus opens the door to other organisms, such as streptococci, pneumococci, staphylococci, and Friedländer's bacilli, and that these secondary infections are largely responsible, not merely for various complications which may arise in the course of a case, but even for the protean forms which this particular fever may assume. The book is beautifully and profusely illustrated, and the new edition is certain of a favourable reception.

WAR AGAINST TROPICAL DISEASE.

By ANDREW BALFOUR, C.B., C.M.G., M.D., &c. London: Baillière, Tindall, and Cox. 1920. Pp. 220. 12*s.* 6*d.*

UNDER this title are collected in one volume a number of lectures, or sermons as the author prefers to call them, delivered on various occasions on the common text of the supreme importance of hygiene in waging war against tropical disease, and published under the auspices of the Wellcome Bureau of Scientific Research.

In addressing different audiences Dr. Balfour treats his subject from many points of view, but always with an erudition and felicity of expression which do the fullest justice to the intrinsic interest of his theme. Interwoven with the subject-matter is a wealth of anecdote and apt quotation, and the result is a volume of absorbing interest, which the reader is not likely to lay aside till he has perused it to the last word. In the lecture on preventive inoculation against typhoid and cholera, originally delivered at a meeting of the Research Defence Society, nothing is lost through the presentation of the subject in non-technical language, and the essential facts of immunity are indicated in a manner which is intelligible to those who do not possess a strictly scientific training. Included in the series are the Chadwick lectures for 1919, in which the author deals with the problem of hygiene in Egypt, and comments on the important findings of the Commission, of which he was the chairman, appointed to inquire into the organisation and work of the public health department of Egypt. These lectures were published in full in THE LANCET last September. The only serious defect in a book teeming with information of a practical kind is the absence of an index; this is not compensated for by the very full table of contents.

JOURNALS.

Tubercle. A Monthly Journal Devoted to All Aspects of Tuberculosis. Vol. I., No. 10. July, 1920.—Dr. W. C. Rivers. leads off with a short study of four clinical phenomena of tuberculosis—viz., trauma, muscular signs, vicissitude, and recidivism—treating them with clinical insight though he is mistaken in saying that "until lately practically no consumptive recovered, so that practically none could relapse." There are many historic cases of recovered tubercle: Goethe and Ruskin were doubtless such, and recidivism is perhaps as old as the disease. Dr. Rivers points out the high diagnostic value of trapezius atrophy and shoulder drop in pulmonary tubercle, and concludes by suggesting that the four phenomena above referred to indicate a high degree of natural immunity, and would thus probably be rare in lunatics and in negroes and Polynesians.

New Inventions.

A SIMPLE FORM OF RHYTHMIC INTERRUPTER.

IN treatment of paralysis following poliomyelitis, &c., by means of arm and leg baths it has frequently been shown that a rhythmic interruption of the current produces the best results. This is usually obtained by a motor-driven contrivance, which is bulky and expensive. The apparatus described below can be made for a few pence, and I have found it perfectly automatic and reliable. In construction it is somewhat similar to that described by Dr. Norman Aldridge in THE LANCET of Jan. 8th, 1910. The syphon arrangement of the present form was found to work more evenly.

The apparatus consists of A, a glass tube 6 in. long, ⅜ in. bore, open at both ends, and connected by means of rubber cork B with glass tube C, which is bent in the shape shown and has ¼ in. bore. At the end of C is fitted a rubber tube D, of convenient length to discharge into sink or pail. Two electrodes, E E', are then cut from sheet copper 3 in. long, ¾ in.

FIG. 1.

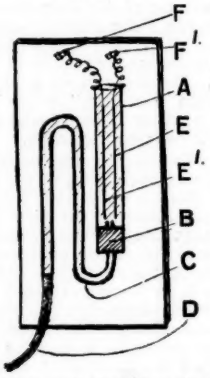

FIG. 2.

FIG. 3.

wide at top, and shaped as shown in Fig. 2. Wires F F' are soldered to these and the electrodes are moulded to fit the tube A, and kept in position by a short length of rubber tubing, C, fixed between them (Fig. 3). The whole apparatus is mounted on a board. The leads F F' are put in the circuit of the current to the baths, whether this be continuous, sinusoidal, or faradic. The apparatus is then suspended from a water tap and the flow of water adjusted. It will be found that the water will rise in the tube A until it reaches the level of the top of tube C, and will then syphon automatically. As it rises more and more current will flow between the electrodes until a maximum is reached and then it will wane to zero again.

A suitable periodicity is about 15 per minute, and this rate is obtained in the apparatus described. The rate depends on the ratio of the bore of tubes A and C, and bearing this in mind a quicker or slower periodicity can easily be obtained. Debedat, experimenting on rabbits, used a periodicity of 30 per minute and showed a 40 per cent. gain in weight with faradic current and an 18 per cent. gain with galvanic current. He stimulated the hamstring muscles of one side four minutes daily for 20 days and obtained these results by comparing with the opposite side.[1] H. Bordier made similar experiments on muscles of a healthy human being and obtained similar results.[2]

It is important to prevent stretching of the paralysed muscles by the opposing set, and to obviate this light splints can be arranged during the bath treatment.

Sutton, Surrey. J. NEIL LEITCH, M.B.

[1] Archives d'Électricité Médicale, February and March, 1894.
[2] Ibid., 1902, p. 331.

THE APPOINTMENT OF WOMEN MAGISTRATES.—Early in the week a list was issued by the Lord Chancellor containing the names of the women to sit on the judicial bench in England, Wales, and Scotland. The names were submitted to him by the Women's Central Advisory Committee appointed for the purpose. Amongst the names, which are not intended to be complete, appear those of Dr. Ethel Bentham, Dr. Janet Lane-Claypon (dean of the Department of Household and Social Science in King's College for Women), and Dr. Mary Scharlieb.

THE LANCET.

LONDON: SATURDAY, JULY 24, 1920.

The Organisation of Medical Service.

THE Health Services Vote, that is, the vote for the salaries and expenses of the Ministry of Health, including the grants and expenses with regard to Housing, the grants to Local Authorities, and those to meet the demands under the National Insurance Health Acts, was taken in Committee in the House of Commons at the end of last week In our Parliamentary report there will be found a résumé of the important speech in which Dr. ADDISON told the House and the country something of the size of the problems which his Department in the first year of its existence had had to deal with, and something of the way in which the responsibilities had been met. The things to be done and the ways to do them were alike so multifarious that it would have been as useless as impossible for the Minister of Health to do more than give outlines, but every word that was said by Dr. ADDISON revealed that necessity for the organisation of the health services of this country which was the origin of the Ministry of Health, while his description of the courses taken to meet the various difficulties and the commencements made to deal with them showed insight and foresight. During the first year of its existence the amalgamation of the work of the Health Insurance Department with the Registrar-General's Department and with the work of the Board of Education, both in regard to School Medical Service and the care of prospective mothers, has proceeded steadily; the duties of the Home Office under the Children Act are being brought into line with the activities to which they have a natural affinity; while definite steps are being taken to deal with the position of lunacy, the incipient stages of which have hitherto been neglected by preventive medicine.

Such is Dr. ADDISON'S message to the country, but in the meantime developments have taken place indicating with some particularity the part to be played by the practitioner of medicine in this huge programme. In announcing last week the appointment by the Ministry of Health of a service of outdoor medical officers for whole-time duty we suggested that those officers, who represent a distinct advance in the organisation of panel service, would also play their part in the general organisation of the medical service of the country in its initial stages. How this will come about exactly in any given place depends upon local circumstances to a great extent, and it is previous to dwell upon this side of the matter while many of the detailed activities promised under the appointment of outdoor medical officers have still to be put in going order. At the present moment the great necessity for medical men is to take an all-round view of what is being done by the Ministry of Health for the national organisation of medical service. How is the general plan of the Ministry evolving is the question now, and the subsequent questions will be—How does any particular action or promise of the Ministry fit in with that plan? A profession like that of medicine is not expected by anyone to follow blindly an arbitrary leadership—the whole spirit of Dr. ADDISON'S administration shows that he expects nothing of the sort; but the task before his department and before the medical profession, upon whose shoulders the future work will mainly lie, is so far reaching, and so intimately bound up with the social life of the people with its multifarious interests, that it cannot be easy for any of us to keep the central ideas prominent. The Interim Report of the Consultative Council of Medical and Allied Services for England—it will be more convenient if for the future this document is alluded to as the Dawson Report—has now been under the consideration of all sections of the medical profession, of the British Medical Association, and of the public for some weeks, while here and there points in it have been the subject of Parliamentary comment. The ideal nature of many of the proposals is confessed, and the expense of the institution of any such scheme in entirety would be colossal, so that no one, least of all the Council itself, expects legislative realisation of the recommendations *en bloc* and at once. But all the public notice which the Report has received confirms one impression. It is this. That it is considered, alike by the medical profession individually and through the British Medical Association, that the erection of Primary Health Centres is not only a pivotal part of the projected scheme, but a necessary development of the modern reading of preventive medicine in the larger sense—not the preventive medicine called hygiene, but that preventive medicine which forms the therapeutics of the future and which aims at arresting disease at its inception. Of the way in which the Primary Health Centre may work, practical illustration has been given both in the Dawson Report and in the recent discussion thereon at Bristol, when Dr. MIDDLETON MARTIN, the medical officer of health of Gloucestershire, described what had been proposed in his own county. We may take it for granted that something analogous to the organisation which he explained, and whose features may have been familiar to some of his audience, is beginning to work in Gloucestershire and will be applied elsewhere, assuming that the necessary expenses can be met. For purposes of clearness the statement must be repeated that Primary Health Centres cannot all be of the same pattern and probably will not be able to discharge the same public and professional duties. But they should all have this in common—whether they be newly constituted centres, or developments of existing cottage hospitals, or intimately allied with secondary or superior health centres as developments of the out-patient departments of voluntary hospitals—they will all be centres at which the professional and scientific activities of the general practitioners of the neighbourhood can be concentrated and from which they can be diffused.

The first stage, then, in the organisation of medical service under the Ministry of Health promises to

be the establishment of Primary Health Centres, with due regard to local circumstances; and we see at once that, as these centres are to be based upon Secondary Health Centres, in other words upon the great voluntary hospitals, the voluntary principle will be supported in the main, however much local circumstances may here also play a part in dictating the measure of State or municipal assistance required. But the general practitioners who will staff and conduct the Primary Health Centres will in a great proportion of cases be associated with panel practice, the practice in which the new outdoor medical officers will play an important part in the future. Thus a medical service coördinated in all its forms should arise, the general practitioners of the country being the foundation upon which the fabric stands. Their energies, private or public, and whether grouped at their centres or diffused in part-time appointments of a public nature, will be brought into touch alike with all that the great voluntary hospital stands for in knowledge, research, and training, and with the official administration of the Ministry of Health.

Plastic Surgery of the Face.

SUCCESSFUL demonstrations at the Cambridge meeting of the British Medical Association no doubt brought home to a wide circle the progress made during the last few years in the plastic surgery of the face. The awful disfigurements produced by war wounds of the face must have seemed to some of the sufferers worse than death itself, and the appeal of their mental sufferings to the surgeons confronted with the task of alleviating their condition was assuredly very great indeed. These demonstrations were given by Mr. P. P. COLE and Mr. H. D. GILLIES, whose names have for some time been associated with the advances that have been made in the plastic surgery of the face, and now the latter has made public in a large and fully illustrated volume[1] the results which he has obtained following on the intensive work at the Queen's Hospital, Sidcup. This hospital was staffed by officers picked with great insight from institutions whose loss became Sidcup's gain. Our columns have included at various times the work of Mr. KELSEY FRY, Mr. J. L. AYMARD, Mr. G. SECCOMBE HETT, Mr. H. P. PICKERILL, Mr. GILBERT CHUBB, and others. Hence, while special departments at other hospitals were earlier in the field, notably that of the Eastern Command at Croydon under Sir FRANK COLYER'S direction, Sidcup has naturally obtained the larger measure of public recognition. No doubt all the medical staff at Sidcup felt very strongly the emotional appeal to which we have alluded, and the wards, we know, afforded extraordinary opportunities for observations on the psychology of the wounded man; but it is clear that they have also been stimulated by the pride of the craftsman, and it is, naturally, this side of their work which is described in the volume before us. Mr. GILLIES modestly points out that nearly all the methods employed have been in use for many years, some of them for six centuries or more, but ancient lineage does not detract from modern prowess. It is quite evident that for the developments of technique initiated at Sidcup inventive courage and an almost superhuman patience were needed, and even these qualities would not have led to success unless coupled with an unusual dexterity and ingenious and creative minds. Many of Mr. GILLIES'S operations were so boldly conceived that it might well have been forgiven him had he compromised with the misgivings he must occasionally have felt in carrying them out. But scientific conviction did not fail; rather it found support in hope and imagination, which carried the various operators over periods of failure and depression and allowed them to call upon their patients for trust.

In the final result it is not only those suffering from the immediate effects of the war that have benefited, but also those who have endured the ravages of disfiguring disease or accidents. The work first devised and done at Sidcup has passed into civilian practice, and some strikingly successful cases of plastic operations for conditions such as lupus and epithelioma of the face were shown at the Cambridge meeting. It is now possible to enunciate certain principles which must affect the course of surgery in the future. Never before has "cosmetic" work been done in such bulk or subjected to such searching criticism, but now it can be claimed that the science of plastic surgery is being built up on solid foundations, with much of the evidence fully recorded. The first great principle that is laid down is the paramount importance of restoring function; good cosmetic results will follow if this principle be never forgotten. The fashioning of a new nose failed until function came to be the prime object; the elaborate operation finally devised has in many cases been entirely successful both functionally and cosmetically. The same principle stimulated the elaboration and ultimate success of the process of epithelial inlay, of bone-grafting in the mandible, of cartilage-grafting for various purposes, and of other operations on the orbit, eyelids, and lips, ingenious procedures due to many minds and finding many shapes.

In fact, the rapid development of plastic surgery has been a remarkable vindication of the value of "team work," the team consisting of surgeon, dentist, and artist. Mr. GILLIES was fortunate in having the help of Mr. KELSEY FRY as dental surgeon, and of Professor HENRY TONKS, an anatomist and surgeon who long before the war had deserted medicine for art, but who here found an opportunity for reconciling his double range of great accomplishment. Mr. GILLIES in the preparation of his book has fully recognised the value of graphic record in this branch of surgery. He is throughout sparing of words, but prodigal of pictures and diagrams, so that the work easily achieves lucidity. And this is well, for the general application of the same methods to the conditions met with in civil practice is of immediate importance, although the time may hardly yet be ripe for a department of plastic surgery at a general hospital. The defacements of heredity, disease, and accident are insignificant compared with the results of high explosives. The world of surgery may feel encouraged by the results obtained by plastic surgery in the war, but Mr. GILLIES'S book should go beyond the circle of his professional brethren and be distributed as a deterrent to the politicians of every country, for the things thus put before their eyes might well be a potent factor in promoting peace among the nations.

[1] The Plastic Surgery of the Face. Based on selected cases of war injuries of the face, including burns. By H. D. Gillies, C.B.E., F.R.C.S., Major, R.A.M.C. London: Henry Frowde, Hodder and Stoughton. 1920. Pp. 408. 3 guineas.

Drugs and their Active Principles.

WHEN we consider the many drugs in present use that owe their properties to unknown constituents we must admit that an almost eternal task lies ahead. Senna tea has been the standby of a thousand years of grandmothers; squill and hemp were used as medicines 1500 years ago; gentian was commonly employed in the middle ages—and yet to-day we do not know what gives their virtues to any of these drugs. To go back to even more remote times, there is rhubarb, whose qualities were known 5000 years ago, and yet our knowledge of its active principles is very incomplete. Not long ago there was a sanguine school which believed we were on the threshold of an era in which old methods would be discarded, and that instead of using preparations of raw drugs we should isolate and prescribe the principles which give these drugs their properties. We are almost as far away from this as ever. It is true that research workers have discovered most of the secrets of a considerable list of important drugs, including belladonna, cinchona, ipecacuanha, opium, aconite, and a number of others; but although atropine, quinine, emetine, morphine, and aconitine are readily available in a pure state, the tinctures and other preparations of the new drugs from which these active principles have been isolated are still in daily use. And rightly so.

These reflections result from a perusal of the informative and suggestive address on Progress in Science and Pharmacy delivered by Mr. C. A. HILL, the President of the British Pharmaceutical Conference, at the annual meeting of the Conference held at Liverpool this week. That tincture of nux vomica continues to be prescribed instead of strychnine is not merely because of habit and tradition, but because of the difference between the action of the tincture and the pure alkaloid. This difference, says Mr. HILL, is mainly to be attributed to the effect of the extractive matter in retarding the rate of absorption and in retaining the alkaloid in solution even in the presence of alkaline media which would precipitate pure strychnine. Let us take opium and its alkaloids; it is common knowledge that the replacement of the crude drug by morphine and codeine is far from complete; the reason in this instance is that opium contains more than 20 different alkaloids, possessing varied physiological properties, in addition to several organic acids and other matter. The presence of these substances in opium preparations serves to delay and sustain their action, and since sustained action is often what is required in a narcotic drug it is clear why galenical preparations of opium retain their vogue. Obviously, there are cases where the more rapid action of strychnine or morphine render these alkaloids more suitable than preparations of nux vomica and opium, but there is an abundance of evidence in favour of retainng both classes of medicament. Until quite recently there seemed little doubt that preparations of cinchona bark had been almost superseded by quinine, but the work of Major H. W. ACTON, to certain results of which much importance is attached, indicates that while quinine is useful in the treatment of malignant tertian malaria, it is of small value in eradicating benign malaria; on the other hand, the total alkaloid of cinchona is found by Major ACTON to be effective for the latter purpose. These few examples serve to show that when we have isolated the active principles of drugs our work is not completed. However much we may wrest from her, Nature still holds back some secrets. It may be the presence of other active principles and of apparently inert matter that causes the difference in action, or there may be yet undiscovered and more mysterious causes; for, in Mr. HILL'S phrase, as our knowledge of such bodies as vitamines, enzymes, and hormones advances, so our respect for the natural sources of such bodies increases.

All this suggests possibilities of danger in over-refinement. Search how we may, some drugs have constituents, minute in quantity but of the highest degree of importance, which we have not yet been able to discover. We can only go on working with the prospect that when our work is done we shall find that Nature is still the superior artificer. In the course of his argument the President of the Conference used as an analogy, and we think very aptly, the causation of beri-beri; as is now well known, this disease is caused by the refinements of rice-milling, brought about by the introduction of machinery. The absence of something—belonging to a class now widely known as vitamines—in the rice, removed in the process of steam polishing, was the cause of the trouble. Scurvy, which used to be the scourge of the navy, yields readily to a diet of potatoes, cabbages, and most fresh fruits; sailors in the old days died of scurvy because they were deprived of the vitamine contained in this diet. We think it is permissible to apply both these analogies to the case of drugs. Refine by all means, but let us remember that there may be more danger in our process than in no refinement at all. It is not because we are slaves of habit that galenical preparations of whole drugs are still in some cases preferred to the active principles, but rather because clinical experience, now endorsed by the laboratory, has demonstrated that the crude drug may have advantages over the refined one. Herein is clinical wisdom justified of her children.

Annotations.

"Ne quid nimis."

THE REALM OF NEUROLOGY AND PSYCHOPATHOLOGY.

THE two lectures which appear in full at the front of our present issue are an indication of the amount of keen thought that is being devoted to the subject of nerve symptoms, using this term as Sir Thomas Horder uses it in the widest possible sense. Dr. A. F. Hurst, in his first Croonian lecture, limits himself strictly to a consideration of changes in cutaneous sensation, but finds even within this limit material for an almost new conception of functional nervous disorder. Sir Thomas Horder sets out to help the practitioner faced with a patient taken suddenly ill with a symptom-complex containing elements of a nervous kind. Both tread on ground, broken, indeed, by the neurologist, but on which the practitioner must follow. The first number has recently appeared of a new quarterly journal devoted to neurology and psychopathology, published under the direction of an editorial committee of three in each of the two compartments: Dr. S. A. K. Wilson, Dr. T. Graham Brown, and Dr. R. M. Stewart for neurology; Dr. Bernard Hart, Dr. Henry Devine, and Dr. Maurice Nicoll for Psychopathology; with Dr. Carey F. Coombs as editorial secretary, the journal being

published[1] in Bristol. Two brief and pointed unsigned articles show what is the editorial mind in embarking on the troubled waters of special journalism. The first pictures the realm of neurology invaded on all sides by the doughty protagonists of endocrinology, ophthalmology, psychotherapy, embryology, biometry, eugenics, and many another. Neurasthenia might, indeed, it is humorously suggested, be rescued as the remaining fragment of the neurologist's kingdom were he not "assured by the endocrinologist that it is a disease of the ductless glands, by the alienist that it is a form of mental disorder, by the cardiologist that it is a functional cardiac disturbance, and by the Freudian that it is a sort of nosological Mrs. Harris." The truth is rather that the neurologist of to-day pursues the study of either psychical or physical side, or both, and has succeeded to an empire built up by the scientific and clinical research of many groups and fellowships of workers. The second editorial article carries this thought further and suggests that the most fruitful line of advance at the present time is that of biological reaction, mental and nervous disorders not being distinguished as disease entities, but rather as different types of reaction to environment shown by a psychophysical organism. With these aims we are in cordial agreement, and we believe that a journal in which they are successfully applied will appeal to a very large number of the growing generation of medical students and graduates who have not been brought up to accept without question the dualistic conception of mind and matter, and who feel more at home in the standpoint of the behaviorist, as lately set forth in Professor John B. Watson's admirable book,[2] which is persuasive by reason of being easy to understand. The same cannot be said for the new psychopathology. As Dr. Geikie Cobb very fairly complains in a letter in our correspondence columns, the nomenclature now employed by psychopathologists is nothing short of bewildering to the practitioner engaged in general work, as much in regard to the terms describing the disorders as the mechanism producing them. This obscurity inevitably tends to produce a separate cult instead of the much needed vivifying effect on medical practice in general. The new journal is not quite free from complicity in this evil, for it allows neurologist to abstract neurologist, and psychopathologist to abstract psychopathologist, which perpetuates a vicious circle. Better, surely, might be a trial of the physiologist's crossed-heads experiment. Abstruse work on psychopathology, reaching the practitioner through the medium of the trained neurologist, would not elude him as it does at present. The interpretation of neurology in the light of psychopathology is no less desirable. Is it too much to hope that in this way we might get something like a satisfying presentation of clinical psychology.

THE CASE FOR CASEIN.

THE employment of "protein milk" in infant feeding is reported to be attended with such encouraging results as are likely to upset former theories as to the inferiority of cow's milk compared with mother's milk for the purpose. It was generally held that the excess of casein in cow's milk as compared with human milk embarrassed the child's powers of assimilation, coupled with the strong saline content of the serum or whey. In our own experience in laboratory examination, cow's milk has seldom been modified to an extent which brought the casein, to say nothing of the mineral constituents, down to the level of the natural pabulum of the child. The use of protein milk in the treatment of infantile gastro-enteritis was introduced by Finkelstein in 1910. He suggested an interesting modification of cow's milk, replacing a litre of milk by the clot of casein, produced presumably by the use of rennet, and mixing it thoroughly with half a litre of water to which is added half a litre of butter milk. A suitable addition of carbohydrate is made (3 to 5 per cent.), consisting of a mixture of maltose and dextrin (Soxhlet sugar). It is obvious that by this procedure the proportion of casein remains the same, but the mineral contents of the cow's milk are halved. The notable decrease in the salts of cow's milk, in milk prepared on these lines, diminishes the saline elements conducive to intestinal intoxication. Further, casein so presented, far from causing fœtor of stools, is an excellent antifermentative, and proves easily absorbable in the infantile alimentary tract. It increases, it is stated, the alkalinity of the intestinal juice and prevents auto-intoxication. These observations are based on a paper appearing in the July number of the *International Journal of Public Health*, published by the League of Red Cross Societies, Geneva, by Ad. D'Espine, professor of pathology and diseases of children in the university of that city. Whilst admitting that in the treatment of the gastro-enteritis of infants protein milk is inferior to mother's milk and not to be recommended as a diet for a healthy baby, yet the author concludes that it proves a food of the greatest service in the treatment of the dyspepsias of infancy, hastening recovery and cure. Protein milk, however, must clearly be wanting in accessory food factors unless the casein clot carries with it the fat.

SACRO-ILIAC SCIATICA.

IN the *Revue de Médecine* Professor J. A. Barré, of Strasburg, and Major P. L. Duprey have described a form of sciatica which has received little attention, and which they term "sacro-iliac sciatica"—sciatica due to disease of the sacro-iliac joint. The sacro-iliac joint is in contact with the lumbo-sacral trunk and its large branch, the superior gluteal nerve. Hence peri-arthritis may affect these nerves. In sacro-iliac sciatica there are two elements, articular and nervous, of which one generally preponderates. The mode of onset varies. A sprain of the joint may occur as the result of torsion of the body in playing tennis. The patient is seized with pain in the upper and inner part of the buttock, drops his racket, and puts his hand on the spot. He walks with difficulty, but on resting the symptoms pass off. The same may occur in lifting an object when in a bad position. A pain which is more tolerable and more diffuse follows. After a time, it may be some weeks, the symptoms of sciatica appear. Another mode of onset is by a febrile attack with arthralgias which become localised in the back and in one or both lower limbs. On turning the patient on his side the region of the sacro-iliac joint is found to be swollen and very tender, while the spine is almost painless, except in the space between the last lumbar vertebra and the posterior border of the ileum. This is a case of rheumatic sacro-iliac arthritis. The patient carefully avoids movements of the pelvis or hip, and examination does not allow more to be ascertained than that the posterior part of the thigh is painful. But in a few days the pain almost leaves the sacro-iliac joint and descends. It is most manifest in the thigh and may extend to the foot. In another form patients who have never had a febrile attack suffer from pains in the buttock and have difficulty in walking. They are generally considered to be suffering from chronic sciatica, but, as its signs may be absent for a long time, malingering may be suspected. Careful examination reveals a series of signs of which several have been overlooked—sacro-iliac pain, atrophy of the muscles of the buttock, rigidity of the lumbar spine, contracture of the muscles of the joint, limping, and ascension of the iliac crest. Radiography reveals an ill-marked articular line, decalcification of the ends of the bones, and foci of osteitis. It is a case of sacro-iliac arthritis, generally tuberculous. In sacro-iliac disease pain may be produced in the joint by different manœuvres—by getting the patient to sit down brusquely, to fall, so to speak, on his ischial tuberosities, by pressing the two iliac crests together, or by pressing on the head or shoulders, which tends to press the sacrum like a wedge between the two iliac bones. Often the patient sits only on the buttock of the sound side. Pressure on the whole buttock on the diseased side is painful not merely over the sciatic

[1] The Journal of Neurology and Psychopathology. John Wright and Sons, Ltd. 30*s*. per annum; single numbers 8*s*. 6*d*. post free.
[2] Psychology from the Standpoint of a Behaviorist. J. B. Lippincott, Co. 1919.

nerve, but over the course of the superior gluteal nerve. Neuralgic sciatica is felt specially in the upper part of the thigh and rarely extends below the knee, though in the paroxysms the pain may radiate to the foot. In this sciatic stage the articular pain has diminished or disappeared. There are physical signs in the form of dorso-lumbar scoliosis with the concavity towards the affected side, lowering of the shoulder, and diminution of the costo-iliac space. Owing to hypotonia of the muscles the gluteo-femoral fold is lowered and the furrow between the buttocks is deviated below towards the affected side. In ordinary sciatica the patient suffers more in the calf and foot, and pressure on the course of the nerve produces acute pain; and it is in the leg and foot that atrophy is earliest. In sacro-iliac sciatica atrophy is earliest in the buttock. According to Professor Barré and Major Duprey, sciatica with a painful sacro-iliac point is due to sacro-iliac disease. The treatment consists in using the ordinary anodynes for the pain (aspirin, aconite, gelsemium), hot air, liniments, and massage. In the rheumatic form salicylate is given. The joint is immobilised by applying a binder of inelastic material extending from the iliac crests to the trochanters.

LIMBLESS MONSTERS.

THE case reported last week by Dr. Cawas Homi is an example of a well-known, though uncommon, type of deformity which has always excited interest among medical men and in the laity. As is the case with so many monstrosities, the condition is usually referred by the mother to some strong pre-natal impression. The impossibility of explaining the modus operandi of a maternal impression, or of imagining it in action, is not of much logical weight in considering the matter, but it has so happened that the deformity in most cases must have been produced at a stage in normal development antedating by a greater or less time the occurrence of the impression. This, in conjunction with modern views as to the percentage of all conceptions which become monstrous to some degree, is enough to afford an explanation apart from the impression; but we still lack reliable data concerning the percentage of pregnant women who suffer from ante-natal impressions. The frequent occurrence of other common malformations with the ectromelic state does not agree with the influence of maternal impression. Dr. Homi's case is not open to the objection that the suggested maternal impression came too late in the gestation-period to have its influence, but is an ectromelic case differing in no other way from the rest; it is to be regretted that no expert dissection of the limbs was possible.

IMPROVEMENTS IN THE INDIAN MEDICAL SERVICE.

IN our last week's report of proceedings in Parliament[1] we gave in detail the new rates of pay and other improvements in the conditions of the Indian Medical Service, as stated by Mr. Montagu in the House of Commons on July 12th. They may be summarised, as regards the chief points, as follows: Formerly, a medical officer on joining, with the rank of lieutenant, drew Rs.550 per mensem until promoted to captain, when he received Rs.700. According to the new scale he commences with Rs.650, and after three years' service becomes captain with Rs.800. Formerly, while in the rank of captain, he obtained successive increments of pay up to Rs.750, Rs.800, and Rs.900 after 5, 7, and 10 years respectively; now he draws Rs. 800 during his first three years as captain, Rs.950 in his next three, and Rs. 1050 in his tenth, eleventh, and twelfth years, reaching Rs.1200 on promotion to major after 12 years, instead of Rs.1000 as formerly. After 15 years he draws Rs.1350, and after 18 years Rs.1500, as compared with Rs.1150 formerly from the completion of his fifteenth to completion of twentieth year, or promotion to lieutenant-colonel. After 20 years' service he now draws Rs.1750 (compared with Rs.1550 previously), after 23 years Rs.1850, and after 25 years Rs.1950, and if on the selected list Rs.2100. Charge allowance, varying from Rs.120 to Rs.240, is also issued to officers in command of all except the smallest hospitals, and in the larger hospitals of the first and second class the second in command also draws an allowance of Rs.120 and Rs.90 respectively. Concessions are to be granted with regard to pensions, passages, and leave; and as regards the status of the Director-General and Surgeons-General, these officers are to have the right of direct access to the Viceroy or Governor, as the case may be, and of access to documents the same as possessed by the Secretary to the Government. The improvements indicated, both pecuniary and in regard to official status, appear to have a substantial value and to evince a genuine desire on the part of the Indian Government to meet the legitimate claims of the officers in the Medical Service.

[1] THE LANCET, July 17th, p. 161.

THE VALE OF SIDDEM.

WITH perfect good faith, doubtless, some of our American friends have commented on the evidences of degradation and immorality which they have found when visiting the cities of Europe, and have congratulated themselves on the superiority in these respects of "God's own country." This complacency will receive a shock if they will devote themselves to the perusal of a book which has just reached us from the United States.[1] Its title seems to foreshadow something of poetry, and its format lends support to the anticipation, for the work is one of those neat and modest little volumes with which diffident minor poets are wont to deprecate their indulgence of the *cacoethes scribendi*. There is, indeed, "poetry" in it, for it starts off with the following rhyme:—

> "All the wicked people
> In the Vale of Siddem
> Thought of things they shouldn't do,
> And then they went and did 'em."

Thus are we prepared to face a grim and depressing story. In a valley through which flows one of the tributaries of the Mississippi river, in the State of Minnesota, there dwells a community known locally as "timber rats" and "bark eaters." Its members are the fruit of regular and irregular unions between several families all hopelessly antisocial. Thus we have the Yaks, from one daughter of whose house there were derived 79 persons, of whom 10 were insane, 15 feeble-minded, and 8 epileptic; the first generation including 14 children, of whom 9 were insane and 1 was feeble-minded. Another Yak married into the Bart family. His wife, herself insane, was one of five brothers and sisters, three of whom were insane. These five had among them 14 descendants, 7 of them being either feeble-minded or insane. Delilah of the Cam family was one of 9 children, of whom 7 were feeble-minded. She married into the Glade family, whose record is much the same, and had 11 children, of whom 2 died young, while of the remainder 1 only was of normal mentality. "Muskrat Charlie" married a feeble-minded woman and had 11 children, of whom 3 died shortly after birth and the rest were feeble-minded. So the story goes on. Summed up, of 1619 dwellers in the Vale of Siddem 892 furnished no sufficient information for any report, 114 died in infancy or early life, and of the rest there were only 156 who could be regarded as normal; 199 were feeble-minded, 34 insane, 125 sexually immoral, and 134 alcoholic—i.e., individuals who drank "habitually and to excess." Of the feeble-minded only about 5 per cent. have been reached by the available agencies for care and control. The outlook could hardly be less satisfactory. As the authors themselves put it: "From the standpoint of eugenic consideration the existence of such communities as the Vale of Siddem makes our present attempts to care for the feeble-minded quite idle. The sources of the apparently inexhaustible supply of mental defectives remain unaffected. It is like trying to stamp out malaria or yellow fever in the neighbourhood of a mosquito-breeding swamp."

[1] Dwellers in the Vale of Siddem. By A. C. Rogers and Maud A. Merrill. Boston: Richard G. Badger, The Gorham Press.

POST-GRADUATE MEDICAL STUDY IN LONDON.

WE have received from the Deans of the Post-Graduate College, West London Hospital (Dr. Arthur Saunders and Mr. Bishop Harman), the prospectus of the Special Vacation Course arranged for the month of August. There will be daily demonstrations and lectures; the subject of each of these is stated in the time-table, and deals with some aspect of medical practice which must be of interest to every practitioner. The full clinical work of the hospital will be available for medical practitioners in the medical, surgical, and special departments. Arrangements have been entered into between the College and certain special hospitals to give facilities to post-graduates in these hospitals—e.g., Brompton has entered into this alliance, to the evident advantage of practitioners who wish to take out a general course and yet desire to do more work on tuberculosis than a general hospital can provide.

DR. COOLIDGE'S SERVICE TO RADIOLOGY.

Dr. W. D. Coolidge delivered an address before the members of the Rontgen Society on July 15th in the new Chemical Theatre of University College. There was a large and representative audience, including a number of the leading scientists and medical men interested in radiology. Dr. Coolidge in his opening remarks paid a striking tribute to the pioneer work done in Britain on the physics of X rays and allied subjects, referring particularly to the work of the late Sir William Crookes, Rutherford, the Braggs, Wilson, Richardson, and others. The lecturer gave an interesting description of the research laboratories of the General Electric Company at Schenectady. From his detailed description of these laboratories it is clear that the equipment of such centres for the practical application of the discoveries of pure science to commerce leaves very little to be desired. He went on with a most interesting description of the steps in the production of ductile tungsten, illustrating the procedure by a number of lantern slides. He described many interesting technical details necessary for the production of a form of tungsten suitable for, amongst other things, the essential parts of an X ray bulb. The most striking feature of this part of the address was the evidence of the infinite care and attention to detail which are required in the handling of this most difficult of metals. Although the lecturer modestly made no reference to the fact, it is well known that the research work in the elucidation of this problem has been carried out by Dr. Coolidge himself. The production of ductile tungsten paved the way for a great advance in the design and construction of the X ray tube. Up to the advent of tungsten in working quantities platinum was used for the target of the X ray tube. Tungsten possesses several advantages over platinum, and soon it displaced to a large extent the latter metal. The very clear description of the methods by which a tungsten button was fixed upon the copper target of the tube enabled the lecturer's hearers to grasp to some extent the skill requisite for the manufacture of a modern X ray bulb. This part of the lecture dealt with the physical and chemical properties which complicate the making of a gas tube. To the radiologist this was most interesting, and helped to explain many of the vagaries of the X ray tube when in action.

The lecturer next proceeded to deal with the further developments and the experimental work which culminated in the production of the tube which bears his name. Needless to say, the metal tungsten enters largely into its construction, the anode and part of the cathode being made of that substance. The standard tube was next described in detail. A large number of interesting experiments were described and illustrated on the screen. The radiation from the target and stem was beautifully demonstrated by a number of pin-hole photographs. The discovery that X rays are given off from practically the whole of the target and stem was at first a rather disconcerting factor. It became necessary to ascertain the exact effects these rays might have upon the quality of the radiographs. Accordingly, a number of experiments were carried out to settle this point. A metal hood was placed in relation to the target; in this were two small openings, one in the axis of the cathode stem, the other at right angles to it. It was found that by this method a large percentage of the stray radiations were prevented from reaching the plate. A small metallic screen introduced into the interior of the tube served the same purpose. Dr. Coolidge next proceeded to estimate the effect of these radiations. He found that the percentage of radiation from the back of the tube was roughly one-tenth of that from the front surface. Nevertheless in practical work, so long as the exposures were relatively short, no very obvious effect was observed on the photographic plate. Another most interesting point, from the radiographic point of view, was the influence of the size of the focal spot on the target upon the sharpness of the radiographic image. An ingenious series of experiments was devised in which both the anode and the cathode could be moved either towards or from one another. The results of these experiments had an immediate practical bearing.

Having dealt fully with the experimental data, Dr. Coolidge proceeded to describe and demonstrate the latest forms of the best cathode tube. Recent models have been reduced in size and have been standardised. The small tube consists of lead glass. Opposite the target is a window of ordinary glass which allows the X rays to pass through. The standardisation of the apparatus used for exciting the X ray tube is another development which has now become possible with the best cathode tube. The demand appears to be for a small portable apparatus which will produce good radiographs almost automatically. This has its advantages, but there are also dangers. The simplification of technique may induce medical men who are not familiar with the dangers attendant upon the use of X rays to venture on such work without counting the cost. The latest forms of the Coolidge tube were described and reference was made to the portable form of transformer. The development of apparatus on the lines indicated should lead to simplification of technique and an approximate standardisation of exposures in radiography. The advantages in therapeutic work will then be immediate. With the tube and transformer immersed in oil it should be possible to obtain with care a greater spark length than is possible with the usual method. In air the difficulty is to prevent sparking when high voltages are employed. In Germany, for instance, the Coolidge tube is made with very long terminals, and it is claimed that spark lengths up to 15 inches are employed in therapy. The oil immersed type of apparatus should make it possible to obtain equally high voltages with the small radiation type of tube. This is an advance likely to play a great part in radiography, for the quality of the radiations from one tube can now be varied from ½ inch up to 15 inches spark length, giving a range of wave length which makes it possible to radiograph objects of low atomic weight, such as flowers, at one end of the scale, while at the other it is possible to get a radiograph through 2 or 3 inches of steel. It is difficult to over-estimate our indebtedness to Dr. Coolidge for the valuable work he has carried out. From the medical point of view alone it is sufficient to state that only those radiologists who have had experience of the Coolidge tube in radiography and therapy are in a position to estimate the revolutionary part it is already playing in their daily work. The discovery of X rays by Rontgen was the first step in a new science. The perfection by Dr. Coolidge of the best cathode tube is another of the great landmarks in the history of X rays.

SELF-SUPPLIERS OF MORPHINE IN FRANCE.

As in this country, the sale of morphine to the public in France has recently been drastically curtailed by law, and the interesting point has arisen whether the medical man is or is not subject to the same restrictions as his patient. Certain medical men, accustomed to obtain medicaments for their own use, not merely by signing an ordinary prescription but by giving an order

for them on a larger scale, recently came into court charged with having obtained from pharmaceutists quantities of morphine in excess of those prescribed by law for the ordinary patient who is, in addition, obliged to obtain a weekly renewal of his medical prescription. Five of these medical men, who appeared before the judicial tribunal of the Seine, pleaded respectively gout, an affection of the lungs, of the heart, of the nerves, and of the kidneys, along with the right to treat their own maladies themselves if they wished to do so. They were acquitted by the tribunal, which recognised the medical man's right to obtain medicaments wholesale, the verdict running, "the doctor who treats himself does so in the exercise of his profession."

PRECANCEROUS LESIONS OF THE VULVA.

As the normal variations in the senile involution of the vulva after the menopause have received but little attention in anatomical and gynæcological literature Dr. F. J. Taussig,[1] visiting gynæcologist to the Barnard Free Skin and Cancer Hospital, St. Louis, has made a careful study of the vulva in 100 women beyond the menopause, noting the age, number of children, age at menopause, general condition of the skin (dryness, elasticity, freckles, keratosis, nævi, &c.), and the local genital condition (size of labia minora and clitoris, dryness, colour, elasticity, scars, presence of vaginal discharge, &c.). Apart from vulvar atrophy, all forms of which were encountered in the normal vulvar skin at this age, four distinct pathological conditions were found—viz., pruritus vulvæ, kraurosis vulvæ, leukoplakic vulvitis, and carcinoma. Pruritus, which in spite of frequent lack of cleanliness was only rarely present, was not accompanied by vulvar atrophy and showed no tendency to malignant changes. The elastic tissue was of normal amount and distribution. Kraurosis vulvæ was associated with an extreme degree of vulvar atrophy and also showed no tendency to malignant degeneration. In leukoplakic vulvitis the skin changes consisted primarily in an absorption of elastic tissue from the uppermost layers of the corium of the vulva internal to the hairy portion of the labia majora. Although some writers have attributed leukoplakic vulvitis to syphilis, the Wassermann reaction was positive in only two of the present series of 19 cases, and neither of these showed active syphilitic lesions. Moreover, the disease is primarily one of old age, whereas syphilis in an active form occurs chiefly in younger persons. Leukoplakic degeneration shows a marked tendency to malignant degeneration. Perruchet found carcinoma in 16 out of 19 cases, and in Dr. Taussig's series 14 out of 20 cases developed carcinoma. Among 9 cases in which carcinoma was present unassociated with leukoplakic vulvitis, in 2 tertiary syphilitic ulceration was definitely associated with the cancerous process, in 2 there was a definite history of trauma, in 1 the cancer developed from the edge of a typical acuminate wart, and in 4 no ætiological factor could be found.

[1] Archives of Dermatology and Syphilis, June, 1920.

THE WORK OF THE SCOTTISH BOARD OF HEALTH.

THE first annual report of the Scottish Board of Health, just issued, deals with the year 1919. Schemes for housing are being satisfactorily prepared by local authorities. In consideration of plans submitted, the view has been taken that approval of houses of less than three rooms would not be justifiable excepting in very exceptional cases, and in one instance only have two-roomed houses been agreed to. Endeavour has been made where possible to have houses provided with larger accommodation than three rooms. The cost of the houses still remains unfixed owing to the uncertainty in the rates for wages, cost of materials, and transport. Much time has been spent by the Board in considering the various schemes framed by local authorities for the prevention, detection, and treatment of tuberculosis. The number of institutions approved at the close of the year for the treatment of tuberculosis was 118, being 96 sanatoriums and hospitals and 22 tuberculosis dispensaries. The number of beds was 2694, being 1 per 1767 of the population. Arrangements for domiciliary treatment continue as before, but the amount allowed per patient for expenditure on medical comforts has been raised from 7*s*. to 10*s*. weekly. Scarcity of labour and rise in costs have deterred local authorities from proceeding rapidly with their plans, and the time allowed by the Treasury for the submission of these has been extended. The original grant of £60 per bed in respect of new buildings has been increased to £180 in the period under review. There does not appear to be any drop in the number of discharged soldiers requiring institutional treatment for tuberculosis. The arrangements made provide for priority of treatment, and except in cases where treatment was refused, a suitable period of residence in a sanatorium or hospital has been provided. School medical services suffered severely as the result of the war, but with the return of normal conditions rapid development is expected. These services deal with a total school population of about 850,000. Of these about one-third are systematically examined annually, while a large number are examined as special cases in addition. The Board has in course of preparation a memorandum on school health administration which it proposes to issue to school authorities at an early date. A central register of the blind is now almost complete, and statistics are in course of preparation showing the country, age, occupation, income, and cause of blindness, of all blind persons in Scotland. The number of Approved Societies in Scotland at the close of 1919 was 240, having a total membership on July 1st, 1918, of 1,533,923. A careful scrutiny of official audits continues to be made with a view to pressing societies to remedy defects disclosed. There is a notable improvement in the bookkeeping of the smaller units. Eleven out of 72 Scottish societies have net deficiencies, while of 25 international societies with head offices in Scotland 6 have net deficiencies. Taking all 97 societies together, there is an excess of £32,000 of total surpluses over total deficiencies.

Sir James Mackenzie has been appointed Honorary Physician to the King in Scotland, in the room of Sir Thomas Richard Fraser, deceased.

RESTRICTION OF THE OPIUM TRAFFIC.—The Edinburgh Anti-Opium Committee, formed for the purpose of promoting the objects of the Hague International Opium Convention, states in a pamphlet just circulated that the friends of the anti-opium cause had for years been expecting that when the Hague Convention came into operation the opium traffic in India and all over the world would cease, except for legitimate—i.e., medicinal—purposes. But a letter dated June 26th from the India Office and signed for the Secretary of the Revenue and Statistics Department, contained the passage:—

"The Government of India do not admit that the opium used in India, or exported, is 'abused'; they do not consider it advisable to limit the export of opium from India to the amount required solely for 'medicinal' purposes; and they do not accept the suggestion that India should prohibit the export of opium in order to force, or to attempt to force, the countries which now receive their supplies from India to abandon their present opium policy. In this connexion, I am to point out that the Hague Convention contemplates, and provides for, the use of opium for other than purely medicinal purposes; it does not stigmatise the use of opium for such purposes as an 'abuse'; and it places the responsibility for regulating the import of the drug, and the derivatives, upon the importing country."

The Edinburgh Anti-Opium Committee, which has Dr. A. H. F. Barbour as chairman of its executive, has replied by passing the following resolution, copies of which have been sent to the Prime Minister and to the various heads of the departments concerned:—

"The Committee thank the Government for the prompt introduction of the Dangerous Drugs Bill, and trust that facilities will be given for its speedily becoming law; they, however, desiderate in it a more definite restriction of both 'raw opium' and morphia and cocaine to medical requirements, which they believe to be the intention of the Hague Articles, when taken as a whole; they also trust that the provisions of the Bill will be extended to India and other Eastern Dependencies, according to the terms of the declaration of the British signatories at the Hague, which says, 'The Articles of the present Convention shall apply to British India, Ceylon, the Straits Settlements, Hong-Kong, and Wei-hai-Wei, in every respect in the same way as they shall apply to the United Kingdom and Ireland.'"

THE BRITISH MEDICAL ASSOCIATION.

EIGHTY-EIGHTH ANNUAL MEETING AT CAMBRIDGE.

SECTION OF MEDICINE.

WEDNESDAY, JUNE 30TH.

THE first session, with Sir HUMPHRY ROLLESTON, President of the Section, in the chair, was occupied with a discussion on the

Nervous Disorders of the Stomach and Intestine.

The opening paper was read by Dr. ARTHUR F. HURST (London), who said that functional disorders of nervous origin were of two kinds: the neuroses, which were independent of mental processes, whether conscious or subconscious; and the psychoneuroses, which had a psychical cause, the latter alone being amenable to psychotherapy. By hysteria he meant a condition in which symptoms were present which had been produced by suggestion and were curable by psychotherapy. He and his fellow-workers had confirmed Babinski's observations that Charcot's physical stigmata were invariably a result of suggestion on the part of the observer, and though an abnormal degree of suggestibility predisposed to hysteria it was not an essential part of it, and hysteria might occur in individuals with a perfectly normal make-up.

The traditional description of the nervous disorders of digestion depended on false ideas of anatomy and physiology. It was assumed that a certain degree of tone and a certain activity of peristalsis were normal, and that a normal stomach secreted juice of a certain strength, and any divergence from these standards was regarded as evidence of disordered function. But his own investigations and the recent chemical investigations by fractional test-meals, carried out by Reyfuss and Crohn in America, and by Ryle and Bennett at Guy's Hospital, had shown that such great variations occurred in the muscular tone, peristalsis, and secretory activity of the stomach in normal individuals that the conditions generally known as atonic dilatation, hyperchlorhydria, and hypochlorhydria might really fall within normal limits. The discovery of variations from the average normal tone, peristalsis, and secretion in persons with digestive symptoms was therefore no evidence that these variations were in any way responsible for the symptoms.

There was not the smallest evidence to show that true neurasthenia in any way affected the motor or secretory functions of the stomach. Though there was little justification for retaining such terms as atonic dilatation of the stomach, hyperchlorhydria, hypochlorhydria, atonic and acid dyspepsia, as descriptions of clinical conditions, there were two varieties of neurasthenic dyspepsia which could only be recognised with certainty with the aid of X rays and gastric analysis—the atonic, occurring in an individual with a stomach having less than the average tone and secretion, and the hypertonic, occurring in one with a stomach with more than the average tone and secretion.

Hysterical vomiting was a condition that occurred frequently, especially in gassed soldiers. Whatever its original cause, auto-suggestion led to its aggravation whilst the primary cause was still present, or to its perpetuation after the latter had disappeared. He came to the conclusion that whenever vomiting persisted for more than a month after gassing it was certainly hysterical. The most important of all forms of hysterical vomiting, which had led to the death of many mothers and of still more unborn infants, was the so-called "pernicious vomiting of pregnancy."

Dr. Hurst had not yet seen a case in which immediate recovery did not follow psychotherapy. It had been proved conclusively that the disturbed metabolism was due to starvation and dehydration, and was not an indication of some obscure toxæmia. We were often too ready to accept our patient's own diagnosis. He said he was suffering from flatulence, and we treated him with diet and antiseptic drugs for flatulent dyspepsia. Careful investigation had shown that fermentation very rarely occurred in the stomach, which empties itself too rapidly and secretes a juice which is too acid for any appreciable amount of bacterial activity to occur. The only common cause of flatulence was aërophagy, which was a psychoneurosis, and, like all hysterical symptoms, could be readily cured by pure psychotherapy.

Passing to nervous disorders of the intestine, Dr. Hurst said that in his experience the symptoms generally ascribed to auto-intoxication caused by intestinal stasis were really produced by purgatives, which led to the absorption of excess of toxic material, partly by hastening the half-digested contents of the small intestine into the cæcum, where fermentation and putrefaction were consequently increased, and partly by causing the contents of the transverse, descending, and pelvic colon to be fluid instead of solid, so that absorption of toxins took place throughout the length of the bowel instead of in the cæcum and ascending colon alone. The majority of cases of dyschezia, or inefficient defæcation, which was the commonest form of severe constipation, were of nervous origin. In many cases no treatment was required beyond explaining to the patient the nature and cause of his condition and persuading him to make an effort to empty his rectum, but occasionally it was also necessary to re-educate the rectum with graduated enemata. When a patient complained of auto-intoxication and intestinal stasis, and gravely discussed the question of kinks and adhesions, producing a diary in which every motion he passed was minutely described, the diagnosis of intestinal hypochondriasis was obvious. The patient should be taught that his auto-intoxication was the result of drugging, that intestinal stasis in moderation was a virtue, as it promoted digestion and absorption of his food, and that we all had kinks and adhesions, and so long as they remained in the abdomen and did not get on the brain they did not really matter. He alone was happy and devoid of that most trying of nervous disorders of the bowel—hypochondriasis—who followed Sir James Goodhart's admirable advice to do as the dogs do and never look behind him. Nervous diarrhœa occasionally occurred which might be considered hysterical, but it was necessary in every case to discover what was the nature of the suggestion which caused the diarrhœa. In most cases the original attack of diarrhœa was emotional in origin, over-activity of the bowel being one of the rarer of the many physical symptoms of emotion. The symptoms having been caused by suggestion could be cured by psychotherapy.

Muco-membranous colitis when not associated with organic disease might be regarded as a neurosis, as it occurred in exhausted individuals whose nervous systems had become abnormally irritable. So long as the patient did not know she was passing mucus she was comparatively well, but when a course of Plombières treatment had made her a connoisseur in fæces a mental element was added which it was often difficult to remove. But get her away from her devoted parent, her purges, and her Plombières and she would soon be free from her psychoneurosis; the muco-membranous colitis, the pure neurosis, might still be present, though it required but little treatment beyond wholesome neglect.

In conclusion Dr. Hurst hoped the discussion would lead to a satisfactory classification of gastric and intestinal neuroses based on observed facts.

Dr. T. I. BENNETT gave a demonstration by charts shown on the screen of the result of some of the investigations which he had made on the secretory functions of the stomach, assisted by several students of Guy's Hospital. Chemical examinations were made every quarter of an hour of the contents of the stomach. He found that the estimation of the acidity of the gastric contents was often grossly fallacious, as he had discovered both hypochlorhydria and hyperchlorhydria in perfectly normal students. He had proved the profound influence of the nervous system on the chemical constituents of the stomach by hypnotising individuals while test meals were being given. A suggestion of hunger caused a marked rise in the HCl curve, and the rate of emptying the stomach was much affected by various emotional suggestions.

Dr. T. R. BROWN (Baltimore) considered that it was a dangerous doctrine to promote that all the cases in question were of nervous origin. Cases frequently occurred which were at first supposed to be hysterical, but afterwards turned out to be of organic origin. He specially referred to obscure cases of gall-bladder disease which were often unrecognised at first. He thought a fundamental principle to apply was that enunciated by Sir Clifford Allbutt—that everything in disease was correlated. The patient should be studied by every known method before coming to the conclusion that the disease was not organic.

Dr. LANGDON BROWN (London) agreed that cases which were supposed to be neurotic often turned out to be of organic origin. He made some observations about the distribution of the nerves of the stomach, and protested against the too rigid diet often ordered in diseases of the stomach. We should make sure that if our treatment did no good it should not at least do any harm.

Dr. J. A. NIXON (Bristol) thought too much stress should not be laid on the psychical factor in these diseases, as there was a danger of overlooking the organic basis, which might be a very small one.

Mr. H. TYRRELL GRAY (London), speaking from the point of view of a surgeon, thought that any advance in the diagnosis of these diseases was to be brought about by a closer association between the physician, the surgeon, and the physiologist.

Professor R. J. BUCHANAN (Liverpool) expressed his belief in hysterical stigmata, a striking instance of which he related, the subject being a man one side of whose face was found covered with flies quite unknown to him, the condition being anæsthesia of that part. He said there were two schools of thought on the subject—the physical and the psychical—but it was necessary to study the subject in all its aspects. In his opinion functional diseases of the stomach were becoming fewer and organic affections more common, and the diagnosis of "hysterical stomach" was often due to the exhaustion of diagnostic resource.

Dr. W. J. TYSON (Folkestone) confessed his inability to diagnose these cases, and remarked how some of them got well after operation and others got well without operation. He did not think we had reached bottom at all in the diagnosis of these cases, but he thought Dr. Hurst's paper would do an immense amount of public good if it checked the self-prescription of purgatives, though he feared it would interfere with the trade of the chemists.

Lord DAWSON said that organic disease often began in a most insidious way. If he made a diagnosis of nervous dyspepsia in a patient he constantly reviewed that diagnosis and tried to upset it if possible. It was important, however, to give the patient a definite diagnosis, for which reason he approved of the term "colitis." There was a danger of allowing patients to become too introspective, and he always found doctors and nurses the worst patients, as they were inclined to attribute their symptoms to the very worst forms of disease they knew of.

Other speakers in the discussion were Dr. R. G. GORDON (Bath), Dr. E. HOBHOUSE (Brighton), Dr. LIBMAN (New York), Dr. CRAVEN MOORE (Manchester), and Dr. R. C. PARSONS (Dublin). The general opinion seemed to be that there was a danger of laying too much stress on the neurotic element, and thus possibly overlooking organic changes and of trusting too much to pyschoanalysis.

Dr. HURST replied, and stated that his method of psychoanalysis simply consisted in a close cross-examination of the patient and an endeavour to ascertain the origin of the symptoms.

THURSDAY, JULY 1ST.

Interest in the second day's proceedings was evidenced by a crowded meeting of members, the subject for discussion being the

Present Position of Vitamines in Clinical Medicine.

The opening paper was read by Professor F. GOWLAND HOPKINS (Cambridge), who said that the modern conception of a deficiency disease was not, of course, based wholly upon a belief in the existence of vitamines. There might be quite other factors of deficiency in a diet which might produce symptoms to be observed clinically, but the hypothesis of vitamine deficiency played a large part in current views concerning the chief examples of the conditions to be discussed.

Professor Hopkins described certain experiments which he had performed, which dealt with the conditions which affected the stability of the so-called fat-soluble vitamine, and the results showed definitely that oxidation played a much larger part in the conditions which destroyed it than did temperature.

Curves were shown on the board which represented average body-weight changes in two strictly comparable groups of rats. The two groups were fed side by side on a dietary absolutely identical in every particular save one. In the food of one set the fat was butter which had been heated for four hours to 120° C., but heated without aeration. The fat given to the other set was the same butter heated in exactly the same way, but during the heating a stream of air was bubbled through the melted fat. As the curves showed, growth in the first set was perfectly normal, while in the case of the second set, though the rats consumed the food satisfactorily, growth continued but for a short time, and the rats then steadily lost weight. Shortly after the end of the period covered by the curves (some 60 days), while the first set of rats remained in perfect health, all those in the second set were dead.

It was easy to show that nothing toxic developed in such aerated fat. Animals taking it in their food after a relatively small amount of normal unheated butter had been mixed with it were maintained in health, and if half of it had been replaced by normal butter they grew well. Clearly the treatment had produced some deficiency. That it was legitimate to speak of the effect as one involving a destruction of the fat-soluble vitamine was shown by the fact that the rats fed on the altered butter showed just those appearances which were peculiar to others fed upon such vegetable fats as were believed to be free from that substance. The suggestion of the experiments was that the vitamine had considerable heat-stability, but that it was easily oxidised—a point of some practical importance.

It was most important to remember that the absence of a specific factor from the food produced results very different from those that followed actual starvation. In the latter case the energy requirements and other demands were met from the tissues, and there was rigid economy of effort and material. But when an individual's diet was deficient in a vitamine he might still be dealing with large quantities of total food. The metabolic machinery might be working at full pressure while nevertheless deprived of some essential wheel or cog.

If there was one clinical condition in which the influence of a deficiency seemed obvious, direct and but little complicated, it was certainly scurvy. There was no more striking evidence to show that the antiscorbutic substance (if there was only one) was of a special nature, coming under the definition of the vitamine, than the fact that while absent rom dry grains it appeared suddenly when the grains germinated.

There was no doubt about the prime importance of the food factor in treatment. The recent quantitative studies at the Lister Institute had yielded results of extraordinary importance, and would put the therapeutics of scurvy upon a really scientific basis. The so-called xerophthalmia, which was a late result of feeding animals upon food from which the fat-soluble accessory was absent, was an extraordinary phenomenon, coming on very suddenly about the fortieth or fiftieth day of deprivation. It commenced as a corneal opacity, and often in a few days there was complete panophthalmitis; the cornea might perforate and the lens extrude. Caught at an early stage the process could be wholly arrested by administering butter, cod-liver oil, or any substance containing the fat-soluble accesscry, though in no other way.

The question of rickets was one which was still much debated, some observers believing in the prime importance of defective hygiene in its ætiology, and others pinning their faith to vitamine deficiency as its causation. Professor Hopkins remained a firm believer in the influence of a specific diet deficiency, at least, in experimental rickets as displayed by dogs, because in Dr. and Mrs. Mellanby's experiments [1] he had seen carefully controlled observations showing unequivocal results. Other experiments, especially those of Dr. Hess and Dr. Unger, seemed to show that deficiency in the fat-soluble vitamine had little to do with rickets. That more than one factor was concerned in the causation of rickets seemed sure; their relative importance remained yet to be determined.

Sir JAMES BARR (Liverpool) said that he had recently had a conversation with a director of one of the largest manufactories of margarine in the United Kingdom, turning out 3000 tons a week, who told him that margarine usually gave rise to rickets, but they were determined that their margarine should not soften the bones of children or any other animal. On scientific advice they were recommended to add a certain proportion of animal fats, but as these were not obtainable they tried the next best thing—viz., yolk of eggs, and they therefore added 64 yolks to each ton of margarine. As he himself ate two eggs every day he found he would have to consume 70 lb. of margarine daily to obtain the necessary vitamines. He therefore preferred to wait until it was available in tablet form. He considered that vitamines were an indispensable substance or substances, which had never been isolated and whose composition was uncertain. He preferred lymphagogues, like calcium salts, of which he knew something, and would allow others to swallow tons of unpolished rice in order to get some imaginary vitamines about which they knew nothing.

[1] THE LANCET, 1919, i., 407.

Dr. HARRIETTE CHICK and Dr. ELSIE DALYELL gave an interesting account of their experiences and experiments in Vienna, and threw on the screen several remarkable photographs of children, and charts showing the emaciated condition of these children and extreme conditions of rickets, all of which had been immensely benefited by adding to their diet various fat-soluble substances, such as butter and cod-liver oil, and also by administering antiscorbutics.

Lieutenant-Colonel R. MCCARRISON, I.M.S., said that on the previous day, in the Section of Tropical Medicine, he had emphasised the effects on the endocrine organs of four factors:—

(1) Deficiency of vitamines.
(2) Deficiency of soluble protein.
(3) Disproportionate richness in the dietary of starch or fat, or both.
(4) The fortuitous occurrence of pathogenic agents in the body.

To-day he wished to emphasise the same thing in the causation of deficiency diseases, such as rickets and scurvy. He exhibited on the screen several photographs of the stomach and intestines of monkeys, and believed that the same conditions occurred in human beings. In general the symptomatic manifestations of dietetic deficiencies were:—

(1) Dilatation of the stomach; (2) indigestion; (3) deficient action of the liver and pancreas; (4) air locks in the small intestine; (5) failure of neuro-muscular control of the gastro-intestinal tract; (6) a tendency to intussusception and to the formation of gastric ulcer; (7) most important of all, colitis.

He had found that when monkeys were fed on a diet excessively rich in starch there was an increase in the weight of the brain by one-seventh of the normal, and this would give rise to confusion of ideas.

Dr. ALFRED HESS (New York) referred to the value of dried milk, 2 oz. of which were equivalent to 1 pint of fluid milk. He said that beneficial results from dried milk depended on the kind of milk used in its preparation; the milk must have been obtained from cows receiving a liberal ration, and must have been dried quickly. With regard to vegetables, an important factor was the soil on which they were grown. He had found that one diet which gave rise to rickets was the so-called protein milk diet. Precipitation of the curds by means of heat led to rickets in about 75 per cent. of babies. He regarded cod-liver oil as almost a specific for rickets.

Dr. G. F. STILL (London) suggested as a reason why some infants did not suffer from scurvy though fed on similar food to those who did develop the disease that those who were at first immune started life with a certain capital of vitamines derived from their mothers, that they lived on this capital for a time, but sooner or later became bankrupt as far as vitamines were concerned. Certain proprietary foods figured much more largely in the history of scurvy than others, and he had seen several cases in which fruit juice had been given for months without preventing the disease. He had found baked potatoes a most important prophylactic of scurvy, but believed, like Dr. Hess, that the soil on which the potato was grown, or the particular kind of orange, or its degree of ripeness, were factors to which sufficient attention had not been given. At present one waited on the bio-chemist for the possibility of stating the exact value of any particular food in units of vitamine. When he was able to do that we should have a means of exact clinical investigation and treatment which at present was lacking.

Dr. LEONARD WILLIAMS (London) said that the community at the present day was hypercivilised. If we knew anything of vitamines it was that they were contained in uncooked food. The community lived upon food from which vitamines were rigidly excluded. We boiled our milk, steamed our vegetables, and cooked our fruit. That was done from a combination of pleasure and fear; pleasure, which he confessed that he himself shared in the enjoyment of the foods so cooked, and fear of the microbe. In cooking it was not only the vitamines which were destroyed but other vitalisers. In our insane fear of our enemies we slaughtered our best friends. An uncooked dietary was, in his opinion, specially good in rheumatism and middle-aged arthritis, also in gastric and duodenal ulcer, and with its adoption constipation and intestinal stasis disappeared. Its results were no less wonderful than those of the thyroid treatment of myxœdema.

Dr. W. H. WILLCOX (London) referred to experiences in the Mesopotamian campaign, in which scurvy and beri-beri occurred to a great extent.[2] Owing to the intense heat and the difficulties of transport, the provision of supplies of fresh fruit and vegetables to the troops in the fighting area was impossible for a certain period. A most serious outbreak of scurvy occurred among the Indian troops in 1915–16. There were over 11,000 cases from July 1st to Dec. 31st, 1916. The men's diet was adequate in calories, having sufficient protein, fat, and carbohydrates, but was entirely free from antiscorbutic vitamines. As soon as it was possible to issue articles containing the necessary accessory food factors the epidemic ceased. Cases of beri-beri also occurred among British soldiers, but the Indian troops remained free from beri-beri, because the main part of their diet consisted of atta—a coarsely ground wheat flour containing the germ and aleurone layers of the grain, in which the necessary accessory food factors were present. They also had a daily allowance of 4 oz. of dhall, small lentils, whole or split.

Dr. ERIC PRITCHARD (London) said that none of the theories as to vitamines explained the pathology of rickets. All conditions of malnutrition created a demand for calcium, and in rickets the bones were starved because the calcium was required for more important purposes. Rickets was more properly called an excess disease than a deficiency disease, and it would be more appropriate to call it a condition of want of balance.

The following speakers also took part in the discussion: Dr. J. C. DRUMMOND, Dr. H. C. CORRY MANN, Dr. S. MONCKTON COPEMAN, and Dr. R. L. MACKENZIE WALLIS (all of London), Dr. C. MUTHU (Wells), and Dr. J. BROWN (Blackpool); and Professor HOPKINS replied.

FRIDAY, JULY 2ND.

A discussion on the clinical significance and course of

Subacute Bacterial Endocarditis

was opened by Sir THOMAS HORDER, who said that we must exclude from our view rheumatic endocarditis, ulcerative endocarditis, which was but a part of an acute pyæmia, and that form of bacterial endocarditis which occurred as a terminal event in chronic diseases. Subacute bacterial endocarditis was the accepted name of a disease having more or less of the following features. The onset was most often insidious; the general symptoms included loss of strength and tone, a sallow complexion with anæmia, moderate loss of weight and fever; the heart gave evidence of endocarditis at some time or other in almost all cases, and in the majority there had been previous valve injury; widespread arterial embolism occurred; in most cases blood cultures were positive, the isolated bacterium being either a short streptococcus, much less often Pfeiffer's bacillus, and rarely a micro-organism difficult of identification, but in all cases the microbe was of low pathogenicity. The course of the disease was slow but progressive, and although remissions occurred, it was, once established, almost invariably fatal. The total duration of the illness was from three months to two years, with an average duration of six months; death occurred from toxæmia, from heart failure, from anæmia, or from cerebral or coronary embolus. The post-mortem findings included a vegetative endocarditis on the valves or wall of the heart, with little or no ulceration, and widespread embolic infarction without suppuration. As a result of the embolic process there was found a form of glomerular nephritis more or less characteristic of the affection. The disease was fairly common. From his own investigations he had found that 1 in 200 patients admitted to the medical wards of a large general hospital suffered from subacute bacterial endocarditis.

[2] THE LANCET, 1917, ii., 677.

Most of the cases occurred between the ages of 15 and 50 and half of them between 20 and 40. In about half the cases met with there was a history of acute or subacute rheumatism or chorea. The existence of old-standing valve lesions was of great importance in the ætiology. There were four cardinal signs of the disease when it was fully evolved. Arranged in the order of their importance from the point of view of diagnosis they were: multiple arterial embolism, endocarditis, the isolation of a bacillus from the blood stream, and fever.

1. *Multiple arterial embolism.*—Close study of the clinical and of the morbid anatomical material available revealed the facts that many more organs and tissues were found to be affected by infarction than was formerly known to be the case, and that many of the emboli were of microscopic size, little else than microbic metastases in fact. These two considerations were of very great importance in the clinical and clinico-pathological investigations of a suspected case. Petechiæ on the skin were very frequent harbingers of more certain signs. Isolated and pioneer petechiæ were common about the regions of the clavicles and at the base of the neck; those situations should be carefully examined. Even more decisive from their diagnostic significance were the painful and discoloured patches or nodes that appeared on the terminal phalanges of the hands and feet, especially on the pads of the fingers and toes. Those patches were doubtless embolic in origin, the affected vessel lying in the deep layer of the skin or in the soft parts beneath the skin.

Many of the symptoms referable to joints and peri-articular structures were doubtless embolic in origin, as they lacked the symmetry of true rheumatic joint affections, there was much less tendency to synovial effusions, and focal œdema and discolouration were common in the overlying skin. Also the situation of the pain and swelling was not seldom one rarely seen in true rheumatism—e.g., the dorsum of the foot, the region of the tendo Achillis, the groin, the sterno-clavicular joint. Gross embolic infarction of the kidney, accompanied by severe pain, hæmaturia, and albuminuria, was, of course, well known. Less widely known, but of great importance, was the occurrence of very minute microbic embolisms in the kidney glomeruli, which was to be inferred clinically by the discovery of red blood-cells and traces of albumin in the urine of suspected or known cases. The urine should be examined systematically over a series of at least ten days, to prove or exclude this glomerular infarction. Small hæmorrhages were also frequently found in the retina.

2. *The endocarditis.*—This might be manifest or it might be masked. When evidence of endocarditis was found it must be remembered that it might be due to old-standing cicatricial changes in the valves, though it was most probably caused by the recent infection. There was, however, general agreement as to the fact that for the major part of its course subacute bacterial endocarditis was very largely destitute of cardiac features. Indeed, our conception of the disease would be in stricter accord with the facts both of clinical and of morbid anatomical observations if we did not regard it as a disease of the heart at all. In this respect it contrasted markedly with acute rheumatism.

We should therefore avoid the error of thinking a patient was necessarily free from the suspicion of infective endocarditis because his heart and pulse on critical examination showed little or no evidence of disordered function, such as arrhythmia, symptoms of inadequate response to effort, or signs of dilatation.

3. *Isolation of microbes from the blood stream.*—Since we had become more familiar with the disease the confirmatory evidence of a positive blood culture was less essential to a correct diagnosis. Sir Thomas Horder regarded a series of negative blood cultures—assuming a competent bacteriologist—as indicating some as yet unknown factor determining the content of the microbe in the circulating blood rather than as indicating that the vegetations were "bacteria-free." They must beware not to assume a better prognosis in the cases in which blood cultures were negative.

4. *Fever.*—This was probably an invariable concomitant of the disease, and its discovery was the commonest early hint that all was not well with the patient, and it was the symptom which brought most patients under observation. Though the pyrexia usually persisted, yet there were often afebrile periods, sometimes lasting for 10 or 14 days, which were often accompanied by increased tone in the patients, and presumably by remissions in the systemic part of the infective process. The afebrile periods preceding the end of the disease were but a sign that the tissue response to stimulation was at last exhausted, that an asthenic stage had arrived, and that the end was near.

In conclusion, the speaker suggested several points for discussion and elucidation, particularly the nature of the infecting organism and its possible habitat in the tonsils, periodontal membrane, and appendix; the importance of a previously damaged heart as a factor in the causation of the disease; and whether in our treatment we should do best to concentrate our attention chiefly on the streptococcus, or try still more diligently than hitherto to find a successful system of chemiotherapy, or spend our efforts largely in non-specific measures, with a view to raising the general resistance, as was the present method of dealing with pulmonary tuberculosis.

Dr. E. LIBMAN pointed out the difference between the pathological findings in rheumatic endocarditis and subacute bacterial endocarditis. In the former the vegetations were small, firm, and covered by endothelium, and in the heart muscle the Aschoff bodies were found, whereas in the latter an entirely different type of lesion was found in the heart muscle—viz., the so-called Bracht-Wachter bodies—and in the kidneys were found the almost pathognomonic focal glomerular lesion described by Lochlein and others. There were two groups of cases of bacterial endocarditis, the acute and the subacute. The acute cases were caused by hæmolytic streptococci, pneumococci, staphylococci, and other organisms. Ninety-five per cent. of the subacute cases were due to non-hæmolytic streptococci; the remainder were almost entirely due to influenza bacilli.

A pathognomonic symptom of the subacute cases was the tender cutaneous nodule, or Osler's node. Other characteristic features were petechiæ having white centres and emboli. Whereas the virus of rheumatic fever and of syphilis attacked normal valves, the infection by non-hæmolytic streptococci of subacute bacterial endocarditis occurred nearly always in valves previously damaged by rheumatic fever. A small number of these subacute cases recovered completely. Dr. Libman had seen four recoveries. About one-fourth of the cases of infection of the valves of the heart by the non-hæmolytic streptococcus recovered spontaneously from the infection without having been known to have the disease. Many cases presented a remarkable clinical picture that was formerly not understood. They had a valvular defect, and presented evidences of renal insufficiency, progressive anæmia, or embolism. Some had a very large spleen, and were mistaken for cases of Banti's disease. Others developed a remarkable dark-brown colour in the face.

There was no method of treatment of this disease that was of any value. It was therefore important to plan a campaign of prevention. All cases of valvular disease should be periodically examined for foci of infection, the teeth, tonsils, and accessory sinuses being the important avenues of entry of the bacteria. Persistent immunisation should be attempted. The importance of this plan of prevention could be realised by the fact that subacute streptococcal (and influenzal) endocarditis caused one-third of the deaths due to valvular disease, and that it attacked, in the main, young people not yet incapacitated by their cardiac inefficiency.

Dr. T. WARDROP GRIFFITH (Leeds) remarked that subacute bacterial endocarditis was characterised by symptoms which were much less mechanical than in the other varieties of endocarditis. The disease produced chemical rather than mechanical effects.

Dr. F. J. POYNTON (London) showed several slides which exhibited bacterial infection in cases of rheumatic endocarditis. In his view subacute bacterial endocarditis always occurred in persons who had originally suffered from rheumatic endocarditis, from which they had temporarily recovered only to be attacked later by microbic invasion in their damaged hearts.

Dr. CAREY F. COOMBS (Bristol) said that in rheumatic carditis the whole heart was affected, and not the valves only, whereas subacute bacterial endocarditis was a valvular lesion primarily. Syphilis was an occasional forerunner of bacterial endocarditis, and some cases could be traced to congenital anomalies; but the most frequently pre-existing disease was rheumatism, and therefore the most important factor in its prevention was the prevention of the incidence of rheumatic attacks.

Dr. A. G. GIBSON (Oxford) laid particular stress upon the search for petechial hæmorrhages and for the presence of blood in the urine as an indication of the existence of the so-called "flea-bitten kidney."

Dr. J. HAY (Liverpool) emphasised the following important clinical points:—

1. An increased tendency to a rapid action of the heart (over 100). He did not attach much importance to extra-systoles. 2. Clubbing of the fingers was quite noticeable early in the disease. 3. Malaise, together with a cardiac murmur, arrested attention and necessitated investigation. 4. Pyrexia. 5. The spleen was enlarged at an early stage.

The diagnosis could be, and ought to be, made clinically, independently of blood examination. From the point of view of prevention the rheumatic stage was the only one that mattered. Every patient who suffered from valvular disease of the heart should be thoroughly overhauled from time to time, and here they must fall back on the general practitioner, who must recognise the position of affairs and prevent the development of the disease.

Dr. A. E. GOW (London) referred to the occurrence of recurrent transient erythema involving the inner side of the calf or the trunk, which he had noticed as a symptom of the disease, and which he believed to be toxic in origin.

Dr. H. J. STARLING (Norwich) related his experience of 38 cases which had occurred among soldiers. In his opinion the chief diagnostic points were:—

1. Insidious onset. 2. Pallor, the face having a pale primrose-yellow colour. 3. Endocarditis; all his patients had valvular lesions. 4. Clubbing of the fingers; present in 76 per cent. of the cases. 5. Enlargement of the spleen; occurred in 81 per cent. 6. Petechiæ were present in 58 per cent. 7. Osler's nodes were only found in six cases. 8. Gross embolic phenomena occurring in large vessels—in 37 per cent. 9. Absence of pyrexia. Fever when it occurred was dependent on embolism.

He had particularly noticed the occurrence of the disease in a fine type of man: 11 of his patients had never suffered from any illness either before or during the war; 12 had had over three years' service in the army, and 15 over four years' service. Post mortem the vegetations found on the valves were calcareous, and in some cases he had noticed a curious condition of the aortic valves, two of the cusps being completely fused together. The spleen was found enlarged in all the autopsies except one.

The following speakers also took part in the discussion:—Dr. THOMAS LEWIS (London), who presided at this session, laid particular stress on clubbing of the fingers as a sign of the disease, and pointed out that petechial hæmorrhages occurred in the form of a ring rather than a spot, and were often situated round the clavicle; Dr. J. M. COWAN (Glasgow); Dr. G. D. LAING (Limpsfield); Dr. R. J. BUCHANAN (Liverpool); and Dr. E. P. POULTON (London) and Sir THOMAS HORDER replied to various points raised during the course of the discussion.

SECTION OF PATHOLOGY AND BACTERIOLOGY.

WEDNESDAY, JUNE 30TH.

Professor J. LORRAIN SMITH presided, and the session opened with a discussion on

Liver Atrophy.

In the unavoidable absence of Professor STUART MCDONALD (Newcastle-on-Tyne) the discussion was opened by Dr. J. MILLER (Edinburgh) and Dr. A. RUTHERFORD (Edinburgh). From a study of their material, which included 15 unpublished cases, they were able to obtain a very complete picture of the morbid changes in the various stages of the disease.

Three types of atrophy—the acute, the subacute, and the chronic or cirrhotic—were distinguished. The latter is termed by the authors "multiple nodular hyperplasia." In the acute form there was more or less complete destruction of the liver parenchyma with a minimum of reaction. The subacute type showed vascular and inflammatory cell reaction, a proliferation of the smaller bile channels, and commencing formation of connective tissue. In multiple nodular hyperplasia regeneration was the prominent feature, the organ showing œdematous nodules of liver tissue and being small or large according to the degree and extent of regeneration. There was no hard-and-fast line between this type and so-called alcoholic cirrhosis, but the age of incidence and possibly the causation were different. Lantern slides and drawings illustrating the macroscopical and microscopical appearances of the various types were then shown. As regards ætiology there was no single cause of acute yellow atrophy. Indeed, a striking point in most of the clinical histories was the number of diseases which preceded or accompanied the liver condition. The most frequent were tuberculosis, syphilis, typhoid, influenza, and scarlet fever. In some cases a single virulent poison caused complete destruction of the liver; in others there was a series of attacks on the liver parenchyma. Death might occur at any stage of the disease, but in the chronic condition the patient was likely to survive for an indefinite period. He was, however, very liable to succumb to intercurrent infection.

Dr. B. H. SPILSBURY (London) said that on investigation of the morbid processes in the liver many conditions were found in which atrophy of the parenchyma resulted from the contraction of scar tissue formed in the course of an inflammatory or toxic process. Such conditions were alcoholic cirrhosis, chronic perihepatitis, and congenital syphilis. In acute yellow atrophy the process was essentially a toxic degeneration of the liver cells with areas of necrosis, and the patient seldom survived long enough for fibrosis to occur in the organ. Fibrosis was, however, found in the subacute form of the disease. In poisoning by T.N.T. and tetrachlorethane there was rapid necrosis of the liver cells, or, where the action was less marked, fatty degeneration which might be followed by necrosis. After a longer period fibrosis occurred with compression atrophy of the remaining liver substance. Scarring of the liver would probably be found post mortem in many cases which had recovered from T.N.T. poisoning.

Mr. A. G. R. FOULERTON (London) dealt with fatty changes in the liver and kidneys caused by various poisons both in the human subject and in experimental animals. He dwelt on the fact that with the exception of arsenic, antimony, and mercury, these poisons are all either fat solvents or are soluble in fats. He considered that the food fat, which is normally mobilised in the liver, reaches the organ combined with a large amount of the poison. The latter destroys the liver cells, which are then unable to deal with the fat. Some of the unaltered fat finds its way to the kidney, which likewise succumbs to the effect of the poison. This theory, which is confirmed by experiment, explains the widespread lesions in the liver and the nephritis which is the common accompaniment of the condition.

Dr. WILLIAM HUNTER (London) considered that the fatty changes in liver and kidney are due to cell degeneration or to the unmasking of fat previously present in the cell. In his view the poison affects every cell in the body simultaneously. If the lesion is severe enough to put the liver out of action the proteolytic ferments which it contains will digest the liver cells and cause the universal destruction which is so marked in the disease. The clinical symptoms are caused by the toxic products from the portal blood and from the liver itself escaping into the circulation.

Dr. MATTHEW J. STEWART (Leeds) spoke of the ætiology of the disease and of the morbid changes in the liver in the cases which had come under his notice. He had followed up several cases of T.N.T. poisoning with symptoms of acute yellow atrophy, which had recovered. The majority of patients were in excellent health; the only symptoms complained of in one or two instances were occasional bilious attacks and epigastric pain.

Dr. J. W. MCNEE (Glasgow) described the changes found in the liver and kidney in Weil's disease. In his experience there had not been any fatty change in the liver or kidneys, although acute nephritis was present. He thought that further work was required on liver function in normal and pathological conditions.

Dr. RUTHERFORD and Dr. MILLER replied.

THURSDAY, JULY 1ST.

Present Position of Cancer Research.

The discussion was opened by Dr. J. A. MURRAY (London), according to whom cancer research presents "a restless complication of bold hazards and miserable disappointments." The difficulties which beset the investigator are not always understood by the public, who regard with a certain impatience the detailed

nomenclature and classification of tumours. They do not understand the very rigid criteria to which a so-called cancerous growth must be subjected before its malignant nature is accepted by the research worker, especially where a so-called "cure" has been proclaimed. These criteria are still mainly clinical—e.g., the progressive character of the growth, the formation of metastases, &c. In animals successful transplantation to normal individuals of the same species is often considered the only valid proof of malignancy, though possibly the establishment of artificial metastasis by autologous grafting is a more just test.

The outstanding achievement of experimental cancer research during recent years was Jensen's discovery of acquired resistance to grafted cancer following an unsuccessful inoculation. Unfortunately, no effect is produced on spontaneous growths by this line of treatment, though, curiously enough, animals can be rendered resistant to a secondary inoculation of the same or another carcinoma without modifying in the slightest degree the progress of the established tumour. The resistant state only lasts a short time. It is accompanied by the appearance of plasma cells in the connective tissues throughout the body. According to some workers immunity is associated with an increase in circulating lymphocytes. It is found that X radiation in rats and mice produces a lymphocytosis or a lymphopenia according to dose, and the increase of lymphocytes is accompanied by increased resistance, their diminution by diminished resistance to implanted cancer. Exposure to a hot dry atmosphere, which is also accompanied by lymphocytosis, appears to prevent the development not only of homologous, but also of autologous grafts. These results, if confirmed, are extremely important, since it has hitherto been impossible to influence the growth of transplanted cancer in the same animal.

Direct attacks on the clinical and therapeutic side of the problem of cancer have so far failed in their object. Probably our knowledge of the fundamental processes of cell life is not yet sufficiently advanced for the purposes of cancer research. The problem as to why the cancer cells are uninfluenced by the forces limiting the increase of healthy or diseased tissues is still unsolved.

Dr. H. J. CAMPBELL thought that carcinoma possibly represented an attempt on the part of the organism to reproduce itself by budding. Growth takes place in organs which are undergoing regression and yet have a plentiful blood-supply. Under such circumstances cells tend to revert to the germinal type. Given a superadded local irritation and a hereditary tendency, cancer is likely to supervene.

Dr. A. LEITCH (London) said that inoculation experiments had been of very great service in clearing the ground and defining the extent of our knowledge. None of us, however, would deduce a theory of cancer from them. He touched on the difficulty of distinguishing between innocent and malignant tumours, and gave parotid tumours as an example. In animals the biological test could be performed, though it was not absolutely conclusive. A tumour might become malignant after transplantation when the original growth was innocent. Artificial resistance, which is produced by unsuccessful inoculation of tumours, is not a true biological immunity. It is not possible to immunise an animal against its own tumour. There are no serological differencies between normal and resistant mice, and none of the serum reactions devised for the detection of carcinoma in the human subject have been of any value. Future bio-chemical research may reveal differences between normal and cancerous cells; until then serological methods of diagnosis were unlikely to succeed. Treatment of cancer by radium had always interested him, but he had never seen a cure.

Dr. S. RUSS (London) referred to Murphy and Morton's experiment subjecting animals to cancer inoculation after exposure to heat. These workers also removed growths from animals, subjected them to X rays, and then reinoculated them, with the result that the tumours did not grow. The function of the lymphocyte was not exactly known, but lymphocytic activity was observed round grafts in immune animals. Nevertheless the number of circulating lymphocytes could be increased by X rays without producing immunity, so that some intermediate reaction was probably required. The difference between homologous and autologous grafts is one of degree. If a batch of animals are inoculated the tumour grows very differently in different animals. In some the growth is progressive, in others the tumour vanishes, and all stages are found between. All animals develop some resistance to grafting, but the degree varies greatly. Dr. Russ made X ray experiments on the production of immunity with the object of applying the results to man.

Dr. J. C. MOTTRAM (London) said that Dr. Murray had very shrewdly touched every important aspect of the cancer problem, but both he and Dr. Leitch took an unduly despondent view of cancer resistance. Cancerous tumours exhibit very different degrees of virulence, and certain species of animals are more susceptible to cancer than others. Heredity is an important factor. Natural resistance is sometimes very high, and, rarely, spontaneous cancer may be absorbed. Artificial resistance is increased by various means, such as grafting embryo tissues and small doses of X rays. Induced resistance, however, is never able to completely protect all normal animals. Our methods of protection are too feeble at present to have effect against spontaneous cancer.

Dr. SIMON FLEXNER (New York) said that a definite relation between lymphocytosis and tumour growth could be worked out. The lymphocytosis may be produced in various ways, but during the lymphocytic period animals are refractory to cancer inoculation. As regards the spontaneous disappearance of tumours in man, it may happen that a local tumour disappears, while metastases in other parts continue to grow. Perhaps we can think of the body being in a different state of immunity in different regions. The disappearance of a growth may be due to a local immunity.

Professor J. G. ADAMI (Liverpool) thought that cancer was due to an alteration of forces in the tissues acting on the cell from without. By appropriate stimulation cells may be induced to take on a habit of growth.

Dr. MURRAY, in reply, commented on various points brought up by different speakers. As regards the cause of cancer, he considered that we were faced with an alteration in the parenchyma of cancer cells, but our knowledge was not sufficient to elucidate its nature.

FRIDAY, JULY 2ND.

Bacteriology of Cerebro-spinal Fever.

Dr. J. A. ARKWRIGHT (London) spoke of the immense amount of work which had been done during the war. He outlined the state of our knowledge in 1914 and the problems which various workers set themselves to solve. The chief interest centres round the classification of the meningococcus. For this purpose morphological, cultural, and serological methods were available. By cultural methods different types were recognisable, but they did not always correspond to the two main groups separated by serological reactions. By methods of agglutination and absorption of agglutinins a number of subgroups could be distinguished, but there was a wide divergence of opinion as to their number and importance. Gordon's division into four types seemed too arbitrary. The serological characteristics bore no relation to the virulence of the organism. As regards carriers, he did not think their isolation was practicable in the present state of our knowledge. The best methods of preparing serum and whether it should be monovalent or polyvalent were still vexed questions. He himself would like to enter a plea for polyvalent serum.

Dr. M. H. GORDON (London) spoke on the researches and observations made in the central military laboratory for cerebro-spinal fever during the war. As regards the pathogenic components of the meningococcus, no certain evidence was found of the presence of an exotoxin, but three intracellular constituents had been identified. The first, a reducing enzyme, does not long survive the death of the coccus. The second, a hæmolytic substance, can be extracted from young cultures by alcohol or acetone. The third is the specific endotoxin of the organism and is chiefly responsible in producing the lesions of cerebro-spinal fever. According to their serological reactions meningococci can be classified into four types. In the cases examined 98 per cent. of the organisms were identified with one or other of these

strains. As a rule, only one type of organism is harboured by patient or carrier. During an epidemic the carrier rate rises considerably. The best way of preventing an outbreak of the disease is to avoid overcrowding. If overcrowding is unavoidable inhalations are effective in temporarily checking the carrier rate. The efficiency of serum treatment depends largely on the amount of anti-endotoxin the serum contains, but the manufacture of a satisfactory serum is still a matter of difficulty. Researches are now being carried out on the standardisation and preparation of antimeningococcic serum.

Dr. T. G. M. HINE (Berkhamsted) analysed 260 reports received from all over the country. These reports included clinical notes and results of treatment. Mortality before serum treatment was about 70 per cent. Mortality from 1914–18 was 60 per cent. in the civil population, but dropped to 35 per cent. in military cases. The latter were treated mainly with Gordon's monotypical serum. The mortality was definitely reduced in cases treated with serum containing anti-endotoxin against the corresponding type of organisms. Serum treatment must be instituted early and in adequate doses to be effective. A pooled serum can be used until the type of meningococcus is identified.

Dr. C. W. PONDER (Maidstone) agreed with Dr. Arkwright as to the uselessness of isolating carriers. An official opinion should be expressed on this point. He examined the bacteriology of the naso-pharynx of non-contacts among the civil population. The meningococcus was found in 41 per cent., and of these 38 per cent. gave sugar and agglutination reactions, and 26 per cent. were positive to absorption tests. These results are higher than those obtained by other workers among contacts. He thought carriers of the meningococcus were comparable to the people who carry pneumococci in their throats and whom no one would dream of isolating.

Dr. A. GARDNER ROBB (Belfast) agreed with Dr. Arkwright that polyvalent sera are of more general use than monovalent sera. Unless he had Dr. Gordon at his elbow to type the organism he would always use the polyvalent. The results with polyvalent sera were as good as those with monovalent sera when figures were carefully compared and the disadvantages and inexperience of early workers remembered. Fallacies might arise in statistics if age-periods are not taken into account. The results in infants were far worse than in people of military age. The death-rate at Belfast, taking all cases, was 27 per cent., and in military cases 12 per cent. Results, taking age-periods into consideration, were about the same in the civil as in the military population.

Dr. J. A. GLOVER (London) showed charts illustrating the effects of overcrowding on the carrier rate and on the outbreak of the disease. After about three weeks of overcrowding the carrier rate rose above 20 per cent., and cases of cerebro-spinal meningitis began to occur. Cultural meningococci are present in the naso-pharynx in normal times, but the proportion of serological types increases enormously in epidemics. As soon as overcrowding was avoided the carrier and incidence rates fell.

Dr. J. C. G. LEDINGHAM (London) spoke of his experience in the East. Detention and isolation of contacts was impracticable, but avoidance of overcrowding and general hygienic measures were effective in checking the disease. The relation of pathogenic bacteria to their homologues needed study. He did not think the use of monovalent serum was practicable.

Dr. W. E. CARNEGIE DICKSON (London) discussed the morbid anatomy of cerebro-spinal meningitis and the paths by which the organism reached the meninges. He produced specimens to show that infection of the ventricles may be earlier and more severe than that of the meninges.

Major W. J. TULLOCH (St. Andrews) answered some of the criticisms made on the work of the central laboratories. He thought too much attention had been called to exceptions in agglutination; 98 per cent. of meningococci can be agglutinated by four typical monovalent sera. Concerning absorption of agglutinins, with the employment of standard technique no difficulty is found in typing the cocci. Standard technique is of the utmost importance both in culture and agglutination experiments, and no work is of value unless the technique followed is described.

Dr. A. C. E. GRAY (London) confined his remarks to the value of antimeningococcal serum. In his experience the mortality depended on the efficiency of the serum used. Efficient treatment during the first three days really settled the issue, and this must be done with polyvalent serum. He had had no success with monovalent serum when polyvalent serum had failed. The occurrence of serum sickness varied greatly with the serum used. It was not due to differences in dose. Administration of serum should not cease with the disappearance of meningococci in the cerebro-spinal fluid, but should be continued for at least four days.

Dr. J. G. FORBES (London) described a case of meningitis caused by the *Diplococcus crassus*, and gave an account of the characteristics of the organism.

Dr. S. R. SCOTT (London) did not consider that there is any magic number of types of meningococcus. Under conditions of overcrowding there is rapid passage of the organism from one individual to another, and it acquires special virulence.

Dr. ARKWRIGHT replied to various criticisms, and regretted that time did not permit him to enter more fully into the many points of interest that had arisen during the discussion.

Dr. GORDON, in replying, said that in any effort to limit the spread of the meningococcus varying susceptibilities must be taken into account. Recruits were more susceptible than old soldiers. Prophylactic inoculation had not proved satisfactory. Monovalent sera were only undertaken as a preliminary to producing an efficient polyvalent serum.

COMBINED MEETING OF THE SECTIONS OF GYNÆCOLOGY AND ELECTRO-THERAPEUTICS.

THURSDAY, JULY 1ST.

AT a combined meeting of these sections, which took place on July 1st, Dr. A. E. BARCLAY (Manchester) took the chair. Owing to the illness of Dr. ROBERT KNOX (London) he called upon Dr. SHILLINGTON SCALES (Cambridge) to read Dr. Knox's paper.

Treatment of Uterine Fibroids.

At the commencement of his paper Dr. Knox stated that it was essential for all cases of uterine fibroids to be examined by a gynæcologist before treatment by X ray was undertaken. He illustrated the benefit of such collaboration by quoting a case in which the opinion of a gynæcologist was refused, with the result that treatment failed to give relief. Later the patient was persuaded to have a second opinion, and it was found tnat she was suffering from a mucous polypus. Pathological reports on the blood were also of great value.

At the special request of the members present full details of Dr. Knox's technique were then read. In his opinion the following were the contraindications to treatment by X rays or radium: (1) Calcareous degeneration; (2) other forms of degeneration if at all advanced; (3) coexisting malignant disease unless considered inoperable; (4) infection of the uterus; (5) pelvic inflammation; (6) inflammation of organs in the vicinity—e.g., cystitis, appendicitis, &c.; (7) submucous pedunculated fibroids. There were several disadvantages to this line of treatment, such as the long time taken to effect a result, treatment being given at intervals of several months. Moreover, treatment is not invariably successful; the tumour is often reduced in size, but does not disappear. The dangers which exist, such as burns, &c., are easily avoided if the treatment is carried out by an expert. There are, however, great advantages. The treatment is quite painless, there is no interference with the patient's routine of life, no operative shock, and rapid return to health when the hæmorrhage has been arrested. Finally, the author discussed the most suitable types of case for this form of treatment.

Dr. H. WILLIAMSON (London) pointed out the advantages of this combined meeting. Before entering upon the discussion of X ray treatment he thought it was wise to realise the very satisfactory results obtained by operation. Hysterectomy at the present time was one of the most satisfactory operations in the whole of surgery. The operation does not deprive the patient of her ovaries, a very important consideration. In his opinion X ray treatment was contra-indicated in the following ten groups of cases: (1) Where the patient is under 40 years of age; (2) where the tumours can be removed by enucleation, either from abdomen or from vagina; (3) where the fibroid shows evidence of degenerative changes; (4) where the tumour is very large; (5) where there is evidence of inflammatory lesions in the ovaries and tubes; (6) where there is any suspicion of malignancy; (7) where there are severe pressure symptoms in bladder, rectum, &c.; (8) where an ovarian cyst is also present; (9) where the fibroid is complicated by pregnancy; (10) where the patient is gravely anæmic, and the R.B.C. less than 2·5 millions. Finally he stated that the most suitable cases for this form of treatment were those over 40 years of age with a small or moderate-sized tumour, with no evidence of degeneration or malignancy, and where anæmia was not a marked symptom.

Dr. LOUISA MARTINDALE (Brighton) read a report on 118 cases of Fibromyomata treated by her since 1914. Of these, 37 cases were treated by X ray therapy alone, in 5 more hysterectomy was subsequently performed. Her choice of treatment was influenced by the size of the tumour. A very large tumour (i.e., a tumour greater than the size of a six months pregnant uterus) was a distinct contra-indication. Likewise were pedunculated or submucous fibroids. The average number of treatments was seven, but amenorrhœa was obtained after an average of four applications. In 4 cases, a further series of applications was necessary after several months. Finally, the speaker gave a very lucid and concise account of the technique she employed.

Dr. CUTHBERT LOCKYER (London) re-stated the views he had published some years ago: (1) Although acting mainly by destroying the ovaries, X rays have also a destructive influence on the cells of the myoma as evidenced by the shrinkage under treatment, which, when achieved, is too rapid to be explained by inhibited ovarian activity alone. (2) Radium and mesothorium alone are not so suitable as X rays for cases of myoma as no shrinkage of the growth can be expected. (3) X rays combined with radium and mesothorium appear to affect more rapid hæmostasis than X rays alone. (4) The French "cross-fire" combined with intensive technique promises the best results; only by "cross-fire" can topographical difficulties be overcome. (5) Treatment is of no avail in cases of submucous growths. Since then he had somewhat modified his opinion in favour of the use of radium. He did not quite agree with the treatment of young patients by this means, until the regulation of dosage was more exact.

Mr. F. L. PROVIS (London) said that the Rontgen treatment of gynæcological cases should be conducted by the gynæcologist himself. A very careful selection of cases should be made and the diagnosis be absolutely certain. The length of time taken to effect a cure has been quoted as a disadvantage of X ray treatment. This statement, critically examined, does not hold good. Compare the result with that of supravaginal hysterectomy. On an average it takes 18 months to cure by X rays, and menopausal symptoms are not severe. It is questionable whether a patient is in perfect health after a hysterectomy has been performed. Also vaginal hysterectomy induces an early menopause.

Dr. S. G. SCOTT (London) considered that satisfactory results are dependent upon two factors: (1) efficient dosage, (2) careful investigation of cases before treatment. He did not, however, think that any final judgment was at present possible: firstly, because sufficient material was not forthcoming, and secondly, because it is only since the advent of the Coolidge tube that it has been possible to give anything like consistent and effective doses.

Dr. AGNES SAVILL (London) spoke of the advisability of fewer and shorter exposures, to avoid the nausea so frequently found after this form of treatment.

Dr. W. MITCHELL (Bradford) agreed with previous speakers that in papers published on this subject dosage was very inexactly described. He considered that the question of dosage to be given in any individual case should be left to the radiologist.

Dr. SHILLINGTON SCALES agreed that our present methods of treatment were largely empirical, and that it was impossible to lay down any accepted standard as suggested by Dr. Cuthbert Lockyer, owing to the fact that the methods of each skilled worker, whilst arriving at the same result, differed so considerably in detail both as to dosage and filtration. No worker skilled in this form of treatment would consent to carry out unquestioningly a prescription of dosage and technique ordered by a physician or even a gynæcologist whose experience in this respect was not so great as his own. For a gynæcologist of equal practical experience would probably prefer to carry out the treatment himself, and Dr. Cuthbert Lockyer's disclaimer of the necessary knowledge would indicate that this would not often be the case. He was glad Dr. Williamson considered that adverse developments following upon X ray treatment were not necessarily caused by it, and he himself thought that operative treatment was followed by even more frequent ill-results. Our knowledge of the biological effect of X rays was still far from exact, and our methods and apparatus so subject to change and advance that standardisation of our technique was at present impossible.

SECTION OF PHYSIOLOGY AND PHARMACOLOGY.

WEDNESDAY, JUNE 30TH.

Meetings of this section took place on June 30th, July 1st, and July 2nd. On the first of these dates a discussion on

Acidosis in Disease

was opened by Professor F. GOWLAND HOPKINS, F.R.S., the President of the section. Professor Hopkins first emphasised the need for the removal of the ambiguity which is associated with the use of the term "acidosis." He then went on to describe the regulation of the reaction of the tissues, pointing out that the blood constitutes a kind of mechanism for the coarse adjustment of the concentration of hydrogen ions, the more exact regulation being brought about by the kidneys and respiratory centre. The disturbance of reaction produced by exposure to anoxæmic conditions as described by Haldane and his co-workers, and the appropriateness of the term "alkalosis" to the description of the symptoms was discussed. Professor Hopkins concluded his speech by referring to the riddle presented by the production of the acetone bodies when carbohydrate metabolism is arrested or disturbed.

Professor W. M. BAYLISS, F.R.S., suggested that there was little use for the word "acidosis" in the sense of an actual increase of concentration of hydrogen ions, as such an effect was rarely produced in life. The symptoms of reduced alkali reserve were probably not due to excess of hydrogen ions. The speaker quoted experiments which showed that the plasma proteins took no part in the regulation of the reaction of the blood.

Further emphasis was placed on the desirability for a clearer definition and application of the nomenclature by Dr. H. H. DALE, F.R.S.

Professor T. H. MILROY pointed out that the acetone bodies were very strong acids, and in this way accounted for the marked fall of alkali reserve in conditions of ketosis. He discussed the increased output of ammonia and the utilisation of alkali administered by the mouth in these conditions.

Dr. E. P. POULTON pointed out a source of fallacy in Van Slyke's method for estimating the alkali reserve of blood on account of the variation of the carbon-dioxide combining power of the plasma with the carbon-dioxide content of the blood from which it was separated. He then referred to a number of cases in which the actual reaction of the blood had been measured directly,

and pointed out the divergence between the results of direct and indirect estimations of reaction.

Mr. T. R. PARSONS gave an account of the reaction-regulating mechanism of the normal blood. He pointed out that the "buffer" value of blood was greater than that of solutions of sodium bicarbonate, and ascribed the difference to the properties of hæmoglobin.

Dr. P. J. CAMMIDGE mentioned experiments which suggested that the state of the liver played an important part in ketosis, and hoped that in any new nomenclature care would be taken to establish terms which would be useful in describing the results of future developments of our knowledge.

Dr. MACKENZIE WALLIS emphasised the importance of renal function. He regarded diabetic coma as being produced by a sudden retention of acetone bodies rather than by a sudden increase in the amount of their production. He regarded the pancreas as the seat of formation of a catalyst necessary for the formation of ethereal sulphates, since, in the absence of pancreatic juice entering the intestine, there was little or no ethereal sulphate in the urine.

Dr. W. D. WILKINS called attention to the fact that ketosis was associated with acute mental disease in a large proportion of cases. There seemed to be a relation between the presence of acetonæmia and mental symptoms, since mental disturbances were prominent in uræmia and diabetic coma.

Dr. E. GRACE SHERWOOD gave an account of the occurrence of acetonuria in children suffering from infective disorders.

Mr. S. W. COLE detailed his experiences in the treatment of post-operative ketosis by the administration of glucose and pancreatin. Discussing the ketosis of pregnancy associated with vomiting, he mentioned that it seemed to be due in many cases to a defective action of the pancreas, and in certain cases at least was amenable to the same treatment.

Dr. A. F. MARTIN asked whether there was any connexion between the action of bacterial toxins and the production of acetone bodies.

In concluding the discussion Professor HOPKINS emphasised the value of carefully collected data from clinical experience in the investigation of the cause of the disorder of the metabolism of carbohydrates which led to the production of the acetone bodies.

THURSDAY, JULY 1ST.

Professor J. N. LANGLEY, F.R.S., opened a discussion on the

Treatment of Denervated Muscle and the "Disuse" Theory.

Professor Langley proceeded to point out that the "disuse" theory of muscular atrophy after nerve section, according to which the degeneration of the muscular tissue is directly caused by inactivity, still remains the dominant one. The method adopted for the treatment of cases of muscular denervation will depend upon the theory held as to the nature and causes of the symptoms observed. In order to investigate the effects of the recognised forms of treatment—electrical stimulation, passive movement, and massage—he had carried out experiments on rabbits in which the sciatic nerve had been cut on both sides and the degenerated muscles on one side were subjected to treatment, while those on the other served as a standard. The criterion used for determining the condition of the muscles was their comparative weight. It was found that three weeks' treatment, either by electrical stimulation with condenser shocks or by passive movement or by massage, produced no very decided beneficial effect in delaying or in reducing the extent of the muscular degeneration. Professor Langley also referred to the similar experiments of Hartman, Blatz, and Kilborn, in which the capability of performing work was used as an extra criterion of the condition of the muscle, and in which the periods of treatment were much longer, but which led their authors to the same conclusion. In view of the doubt that these methods of treatment directly benefit the denervated muscle, it was suggested that the beneficial effects claimed by clinicians were due to the incidental circumstances involved in the treatment—namely, care in diet, a general hopeful disposition of the patient, and suitable safeguards against further injury. The condition of the nerve cells during regeneration of their axons was another important factor in the recovery, as suitable stimulation was known to produce a more rapid regeneration of the severed nerve fibres. In conclusion, Professor Langley pointed out that the most cogent argument against the commonly accepted "disuse" theory was the observation that a denervated muscle was in a state, not of rest, but of perpetual rhythmic fibrillar contraction.

Dr. E. P. CUMBERBATCH said that the conclusion that electricity is of little or no value in the treatment of denervated muscle was opposed to the opinions of those who had had long experience in the electrical treatment of paralysis. He described a case of infantile paralysis of both lower limbs in which a considerable return of voluntary power resulted from treatment with the sinusoidal alternating current. This does not produce muscular contractions, but probably acts by stimulation of the severed neurones by afferent impulses from the skin. After voluntary power is regained currents which cause contraction may be used provided their application is not carried to the point of producing fatigue. The speaker also referred to the need for maintaining a proper temperature in the treated muscles, as cold greatly retards recovery.

Dr. W. J. TURRELL pointed out that Professor Langley's experiments applied to the period of three weeks immediately following the nerve section, which is a period concerning which electro-therapists have little experience, as electrical treatment is usually begun at a later stage. It is only after nerve irritation has ceased that electrical stimulation should be applied. The requisite warmth of the affected part can often be suitably maintained by means of the galvanic current.

Dr. F. HERNAMAN-JOHNSON recommended the use of the faradic current for the production of long-continued contractions in a muscle in which voluntary power is beginning to return. He pointed out the need for avoiding fatigue in this method of treatment.

Dr. E. D. ADRIAN proposed that if electricity merely acts as a suggestive remedy it might be replaced by something simpler, cheaper, and more impressive; but he considered that electricity does produce direct effects. The general view is that electrical treatment usually results in at least a certain amount of contraction, and this might be of benefit in freeing the muscular fibres from adhesions produced by the overgrowth of connective tissue, the muscle thereby being kept in good mechanical condition.

Dr. NOEL BURKE would have expected that the treatment applied by Professor Langley during the first three weeks of degeneration would have been positively harmful. Nothing can be done to prevent the initial degeneration of the muscle after section of its nerve. In these early stages a non-contracting current is indicated which acts by producing chemical and reflex effects. It is only in the recovery stages that contracting currents should be used together with re-educative treatment.

Dr. FF. ROBERTS called attention to the danger of overstretching a denervated muscle. He had observed that among the denervated leg muscles of the rabbit those which were stretched in the normal position of the limb suffered the greater amount of degeneration. This factor may enter into Professor Langley's experiments, as the beneficial effects of the contractions in some muscles might be counteracted by the stretching to which they were submitted when their antagonists were stimulated. He regarded the psychological effect of electrical treatment as being very great.

Professor LANGLEY, in replying, maintained that there was no break in the series of changes occurring in a denervated muscle from the second day up to a year. The fibrillation gradually dies out as the atrophy sets in.

FRIDAY, JULY 2ND.

Professor W. E. DIXON, F.R.S., opened a discussion on

Quinine and its Related Alkaloids in Pharmacology and Therapeutics.

Professor Dixon briefly referred to the chemistry of quinine and pointed out the relationships between

hydroquinine, hydrocupreine, euquinine, cinchonine, and similar derivatives to the mother substance. He then explained that the characteristic action of quinine on living tissues consisted in a reduction of general metabolism, and illustrated the relative strengths of the quinine derivatives in this respect by their action on protozoa and on bacteria, and by their efficacy in producing paralysis of sensory nerve-endings in the cornea. The striking feature of the quinine derivatives was the relatively small concentration necessary to produce marked effects.

Professor W. RAMSDEN recounted experiments showing that the concentration of quinine in red corpuscles is about one-third of that in the surrounding serum. The ratio of concentration of quinine in urine to that in the blood may rise to a value of about 200, but this secretory activity of the kidney seems not to involve any damage to the organ, as it is unaccompanied by albuminuria.

Major H. W. ACTON related the experience he had had with cinchona alkaloids other than quinine in the treatment of malaria. Both cinchonidine and quinidine gave results of value.

Sir ARCHIBALD GARROD discussed the relation of quinine to the onset of blackwater fever, and while he believed that in certain cases the drug was a contributory factor, in many others the disorder seems to have been induced by exposure to cold or by active violent muscular exertion.

Dr. T. S. HELE recorded his experiments on the rate of excretion of quinine in the normal subject and in patients suffering from blackwater fever. He found that they were markedly different provided a sufficient volume of urine was produced. He drew a comparison between the excretion of quinine and that of ethereal sulphate which followed the administration of poisonous ring compounds to animals.

Lieutenant-Colonel Sir LEONARD ROGERS recommended the treatment of severe cases by intravenous injection of quinine and of others by intramuscular injection of cinchonine acid hydrochloride.

Dr. M. NIERENSTEIN suggested that blackwater fever might be produced by a substance—hæmoquinic acid—which is formed from quinine in the body. This acid is known to have hæmolytic properties.

Dr. J. C. MCWALTER stated that the treatment and prophylaxis of malaria by quinine had been a complete failure.

Dr. C. M. WENYON said that very little new knowledge on the subject of quinine administration had been obtained during the war. The mode of action of quinine was very uncertain, but useful light might be shed on the problem if the plasmodial infection in birds were further studied. It would be useful to know the reason why quinine produces so little effect in this case.

Professor J. A. GUNN had experimented with the alkaloids harmaline and harmine, and had obtained encouraging results in cases of relapsing malaria.

Dr. DALE pointed out that the lack of action of quinine in the case of avian malaria might be due to some influence of the host. He had proved that the same strain of *Entamœba histolytica* was susceptible to the action of emetine in the human subject, but not when transferred to a kitten. He further remarked that if the total alkaloids of cinchona were to be utilised this would have a very profound influence on the present policy of cinchona planting.

Colonel R. MCCARRISON suggested that in cases where the blood pressure was dangerously low this could be counteracted by the injection of adrenalin together with the alkaloid.

Dr. A. G. BODMAN recommended the injection of saline solution as well as the alkaloid in order to assist in bringing the drug into effective contact with the parasites in blocked capillaries.

In replying, Professor DIXON mentioned the harmful effects resulting from the intramuscular injection of strong solutions of quinine.

Demonstrations.

On the afternoon of Friday, July 2nd, the following demonstrations were given in the Physiological Laboratory.

Dr. C. SHEARER: The heat evolved during the growth of bacteria. The cultures were grown in Dewar flasks and changes in temperature measured thermo-electrically.

Mrs. E. W. PARSONS: Constant temperature centrifuge (used in the study of gaseous equilibria in blood) and large centrifuge.

Mrs. D. THACKER and Dr. E. D. ADRIAN: Capillary electro-meter recording the electrical variations in the frog's heart, and other electrical measurements.

Mr. W. HARTREE: Thermopiles for the registration of very small changes of temperature, particularly those occurring in muscular contractions.

Mr. W. M. COLEMAN: The voluntary control of the pulse-rate.

Mr. T. R. PARSONS: Apparatus for determining the hydrogen-ion concentration of blood and other body fluids by the electrometric method.

Dr. E. J. COHN: The preparation of solutions of pure hæmoglobin by dialysis at 0° C.

Dr. H. HARTRIDGE: (1) Colourless safe light for photography; (2) the estimation of carbon monoxide in blood; (3) methods for microscopic illumination.

Mr. G. S. ADAIR: Osmometers. The determination of the osmotic pressure of hæmoglobin.

Mr. J. E. BARCROFT: Air-tight glass room for experiments on respiration.

Dr. FF. ROBERTS and Dr. E. P. POULTON: Apparatus used in determining the dissociation curve of blood, and in obtaining and analysing alveolar air.

Professor LANGLEY: The fibrillation of denervated muscle (to illustrate his opening speech of the morning). Slides showing the absence of central degeneration in nerves tied so as to divide the axis cylinders and medulla, but not the neurilemmal sheaths.

Professor C. A. LOVAT EVANS and Dr. H. H. DALE: A dialysis-indicator method for determining the hydrogen-ion concentration of blood.

Dr. F. H. A. MARSHALL and Mr. J. HAMMOND: Histological preparations and dissections illustrating points in the physiology of reproduction.

Dr. T. LEWIS and Dr. FEIL: An auricular myograph.

Professor and Mrs. E. MELLANBY: Accessory food factors. Dogs exhibiting the effects of deficient diets were shown, and also histological specimens and X ray photographs.

SECTION OF TROPICAL MEDICINE.

WEDNESDAY, JUNE 30TH.

Problems of Filariasis.

This section opened on June 30th, with Professor G. H. F. NUTTALL, M.D., F.R.S., as President, when

Professor J. W. W. STEPHENS read a paper on the Problems of Filariasis, in which he drew attention to the conflicting statements as to the relationship of *Filaria bancrofti* to lymphatic diseases and the erroneous conclusions drawn from the failure to discover microfilariæ in the blood of cases of elephantiasis—a failure due to the death of the adult filaria previous to or following on the stage of the development of elephantiasis. He exhibited tables of figures giving the proportion of population examined and the percentage of those examined and found to be infected by microfilariæ in Amoy (China) by Manson in 1883, in Fiji by Manson-Bahr in 1912, and in Cochin China by Cruickshank and Wright in 1914, and in the case of Manson-Bahr's statistics (see table) the age-periods concerned.

	Population examined.	Percentage infected.		Population examined.	Percentage infected.
0–10	72	1·4	41–50	83	45·7
10–20	222	15·7	51–60	58	44·8
21–30	212	37·7	61–70	39	41·0
31–40	118	47·5			

Tables were also displayed, giving the microfilarial rate among the natives of Fiji and Cochin China in two groups: (1) those showing signs of lymphatic disease; (2) those without evidence of such condition. Manson's data derived from natives of Amoy (China), 1883, agreed with those of Manson-Bahr for Fiji (1912), in that these observers found that the microfilarial rate was greater in group (1) than in group (2), although Manson's data derived from specimens at a later date (1907) than his

original observations and the results obtained by Cruickshank proved to be directly opposite. Microfilarial rates were also compared among those suffering from elephantiasis and those not so suffering; observations of Manson in 1883 and Tribondeau showed that those infected with microfilariæ were more numerous among the elephantiasis than among the non-elephantiasis group, whereas Manson's later figures (1907) and Cruickshank's (1914) from Cochin China showed the reverse to be the case. Comparisons of infection by microfilaria, elephantiasis and lymphatic abscess rates were further provided by tables, and also of the varying rate of infection in different countries. Manson-Bahr in Fiji (1912) found 27·1 per cent., Cruickshank in Cochin China (1914) 20·9 per cent. of population infected. Furthermore, enlargement of lymphatic trunks proved to be nearly ten times as common in Fiji as in Cochin China, and of the lymphatic glands twice as common in Fiji as in Cochin China. Results of the work of various observers seemed to show that the region of the body affected by elephantiasis varied according to the particular country, and much investigation was required to explain this peculiarity.

Dr. P. MANSON-BAHR then read a joint paper by Dr. G. C. LOW and himself on

The Rôle of Filaria bancrofti *in the Production of Lymphatic Obstruction, and a Consideration of Elephantiasis from the Pathological Standpoint,*

in which he discussed the discrepancies of different observers. He attributed them partly to the want of standardisation of methods adopted in securing specimens of blood—a personal factor, and partly to the uncertainty of clinical details as to what constituted glandular enlargement, and the standard of enlargement to be recognised as due to filarial disease, particularly as it was the exception to find the native, accustomed to going about barefoot, and therefore readily subject to septic infection, without slight degrees of glandular enlargement. The question of degree of enlargement involving the lymphatic trunk and what should be regarded as a thickened condition due to filarial infection was one requiring definition. *Filaria bancrofti*, he maintained, had a different habitat in the body which varied according to geographical distribution; in China and India the adult worm inhabited the lymphatic trunks, whereas in the Pacific the lymphatic glands, and especially the epitrochlear gland, were the most usual seat. A further important feature affecting different observers' results and favouring the possibility of erroneous conclusions was to be found in the fact that in the East microfilariæ were nocturnal in their appearance, but in the Pacific they were quite irregular in their periodicity. The degree of pathogenicity of *F. bancrofti* was governed by three fundamental factors. (1) Zoological, according to whether there were dead or living filariæ in the lymphatic glands or trunks, the dead acting as a mechanical irritant. Provided embryos could get free passage through the lymphatic vessels they caused no obstructive disturbance and were, therefore, not pathogenic, and their host might remain in perfect health for some considerable time and only at a later date show evidence of lymphatic obstruction. (2) Pathological. With the presence of *F. bancrofti* in a lymph channel, narrowing of the lumen of the vessel might develop as the result of proliferation of the lining endothelium, and subsequent occlusion be produced. This resulted in obstruction to the free passage of microfilariæ along the lymph vessels to the glands, especially those distal to the obstruction. They laid stress in particular on fibrosis of the lymphatic glands as a pathological feature to which little attention had been drawn, a change accompanied by giant cell formation and eosinophil production, and probably due to helminthic toxins causing inflammatory disturbances, which may be widely scattered and generalised in their effects on the glands. As a result of obstruction to the lymph channels with lymphangitis and consequent lymph stasis, the embryos were unable to survive for long in the stagnant lymph stream and would consequently disappear from the blood circulation, the dead microfilariæ being found only in the lymph capillaries and glands. The parasitic cause became defunct but its obstructive effect remained, and after repeated infestation resulted in the gradual development of elephantiasis. In the diagnosis of tropical elephantiasis the importance of the disappearance of the microfilariæ from the blood-stream required to be borne in mind, as well as the possibility of elephantoid conditions arising from such other causes as septic lymphangitis, from the absorption of irritant poisons, as in a case quoted due to the effect of chrysarobin; also as the result of lymphatic fibrosis following on such infections as spirochætosis.

They emphasised the unreliability of statistics from different sources, the anomalies of which, due to the various factors already mentioned, could be explained and corrected by the proper study of the pathology of the disease. He summarised such study as proving, firstly, that *F. bancrofti* was a parasite of, as elephantiasis was a disease of, tropical and subtropical countries; secondly, that the maximum rate of microfilarial infestation corresponded with that of elephantiasis; thirdly, that the filarial disease rate was double that of the concomitant microfilarial invasion of the blood, and consequently the embryo rate could not be regarded as a true measure of the blood infection in any particular population.

Major E. BLACK introduced his remarks with a reference to his unique experience and early association with the work of Bancroft himself. He agreed with Dr. Manson-Bahr as to the unreliability of statistics bearing on microfilarial blood infection in that microfilariæ might be found in the glands when not in the blood, and therefore their absence from the blood-stream was no measure of the degree of infection. He also pointed out that in Brazil and Western Australia microfilariæ could be found in the blood of almost every person examined without there being any evidence of impaired health, elephantiasis, or enlargement of the glands, and that many of the cases originally examined by Bancroft 40 years ago, and found to be infected, still remained in good health. The state of our knowledge of filariasis was at present far from complete, and explanations were needed as to the night rises of temperature which might possibly be attributed to the presence of microfilariæ in large numbers in the blood. He conjectured that the solution of the problem of toxicity might yet be found and differentiated on the same lines as the dependence of bacteria for their toxicity on the protein of their cell bodies, and that so the toxicity of filariæ might vary according to the composition of their particular proteins. The susceptibility of monkeys to filariasis might also assist in providing a solution.

Discussion.

Surgeon-Captain P. W. BASSETT-SMITH, R.N., considered that much depended on the technique of work employed and on the clinical and pathological conditions in the provision of reliable data. Absence of the effects of a prevalence of microfilariæ in the blood formed a curious feature of filarial disease. A degree of eosinophilia ranging from 50 to 20 per cent. pointed to toxic influences. The presence of microfilariæ in the blood was very little affected by intravenous remedies of arsenic or antimony, which did not appear to exert any influence on the amount of infection. The inoculation of rabbits and guinea-pigs with microfilariæ so far had shown no ill-effects.

Dr. D. E. ANDERSON suggested that the rise of temperature might be due to the quantity of food causing greater activity of filariæ in the evening. In regard to the prevalence of elephantiasis, he thought the number of cases found in St. Kitts and Madagascar was much less than expected.

General P. HEHIR, A.M.S., alluded to the location of filariæ in the generative system and bladder as being common in Calcutta, and, with reference to chyluria, mentioned the first discovery of microfilariæ in the urine by Timothy Lewis in 1871.

Dr. W. F. LAW, quoting from 25 years' experience in British Guiana, had never seen any marked epitrochlear gland enlargement, and referred to the work of Dr. Wise,

who associated the death of the parent worm with lymphangitis due particularly to streptococcal infection.

Dr. B. SPEARMAN asked if Dr. Manson-Bahr had experienced a heavier incidence of filarial disease in men than women. His experience in Uganda had shown that out of a total of 10–20 per cent. infection of the whole of the native population all had been men, and that the disease was very rare in women. He had never found any epitrochlear gland enlargement, or elephantiasis of the upper extremity, breast, or arm.

In replying to various points raised in the discussion, the opener, Professor STEPHENS, observed that the object of his paper was not so much to bring forward the relationship of *F. bancrofti* to filarial disease as to put on record facts already known, and to draw attention to discrepancies which occurred among these records.

Dr. MANSON-BAHR claimed that the investigation of filarial disease should include a complete survey of all tropical countries. There were many statistics available which were the result of anything but exact observation and reliable material. A close observance of accurate and systematic technique was essential, and a new basis of work was much needed to get rid of erroneous results. Among natives it was impossible to attain to anything like accuracy as to the age-periods, and his tables of the age incidence of filariasis were purely approximate. In Fiji he found that more men than women were infected, due, no doubt, to the different habits of the two sexes, the former working in the fields and therefore more exposed to infection conveyed by the bites of mosquitoes, while the women stayed at home.

In blood-cell changes in filariasis he included polymorphocytosis and eosinophilia, but he did not pay too much attention to the latter, as in Fiji as much as 13 per cent. eosinophilia was very common among the majority of natives. Enlargement of the epitrochlear gland was also common in the Pacific Islands, due largely to the fact that the carrier of infection, *S. pseudoscutellaris*, in Fiji shelters among the yam plantations and bites during the day, attacking chiefly the exposed hands of the men labourers. Consequently the *F. bancrofti* would be found to vary its habitat, and similarly the distribution of elephantiasis in the body would vary according to the habits of the natives and the particular mosquito acting as carrier of the filarial infection. In other parts of the world, culex was the carrier, and, biting at night, infected other parts of the body, especially the legs, rather than the arms.

Dr. LOW, also replying, emphasised the importance of obtaining measured quantities of blood and at stated periods, for securing an accurate estimate of the microfilarial rate. Cases of elephantiasis, chyluria, and lymphangitis seldom showed microfilariæ in the blood, from the fact, especially in elephantiasis, that the *F. bancrofti* was long dead. For the embryo-rate two classes had to be considered, those with filarial disease and those without filarial disease. He regarded the great difficulties of work at night as providing possible sources of error. To obtain a correct estimate of the local rate of infection it was important to examine only indigenous natives and to avoid inclusion of those who had migrated from other parts. Unless such migration from uninfected areas was discounted, it would lead to considerable inaccuracies when attempting to arrive at reliable conclusions based on the blood examinations of natives in any given locality. In Grenada he was told there was no filarial disease, and in examining for the embryo-rate, out of 400 natives not one showed microfilariæ. Dr. Kocher had examined as many as 2000 without finding any embryos. In Barbados there was more evidence of infection. In St. Kitts, where there was an enormous degree of filarial disease, the microfilarial rate was 30 per cent. The rate of infection varied much with evidence of filarial disease, as in the case of elephantiasis already mentioned, the absence of microfilariæ from the blood was due to the death of the parent worm long previously.

With reference to the pathogenicity of the filaria, Dr. Low gave instances of the presence of microfilariæ in the blood, followed possibly in five years by the development of elephantiasis, with a disappearance of embryos from the circulation. Fresh re-infection would account for the appearance of microfilariæ in the blood of some cases of elephantiasis. He was well acquainted with the valuable work of Dr. Wise in British Guiana, and remarked on the association between filarial abscesses and the death of the parent worm, which might be due to coccal infection resulting in septic lymphangitis and septicæmia. There was possibly a racial susceptibility to filarial infection in British Guiana, and he regarded the Portuguese and Barbados negroes as more liable to infection than the pure white European, who, however, might, after long residence, become infected. This was probably rather a question of antifilarial prophylaxis, protection by the use of mosquito-nets.

During the course of the afternoon demonstrations Dr. MANSON-BAHR, in illustration of his paper, exhibited a number of interesting microscopical slides showing the pathological changes of filarial disease—e.g., obstruction to the lymphatic vessels, glandular fibrosis, and calcification of the filaria.

Lieutenant-Colonel R. MCCARRISON, I.M.S., read a paper on

Dietetic Deficiency and Endocrine Activity, with Special Reference to Deficiency Œdemas,

in which he described the results of experiments on pigeons, guinea-pigs, and monkeys, produced by feeding these animals on six classes of deficient dietaries: (1) deficient in all three classes of vitamines and in suitable protein, but rich in carbohydrates; (2) deficient in B and C vitamines, and rich in carbohydrates and fats; (3) deficient in B vitamine, but rich in carbohydrates and fats; (4) deficient in A and B vitamines; (5) B vitamine only lacking; (6) C vitamine deficient. He attributed the effects of these dietaries on the endocrine organs to the action in varying combination of, firstly, deficiency of vitamines; secondly, imperfect balance of the proximate principles of the food; and thirdly, the chance occurrence of pathogenic agents in the body. As the result of dietetic deficiencies, all endocrine organs except the adrenals and pituitary body, which underwent enlargement, suffered varying degrees of atrophy and lowering in functional capacity. Colonel McCarrison described the alteration which took place, following on the use of the various deficient diets in the different animals experimented on, and displayed diagrammatic charts showing the relative changes produced in the endocrine organs, the thyroid and parathyroid glands, the gonads, the pancreas, thymus, spleen, pituitary body, and adrenal glands.

The effects, such as atrophy and hæmorrhagic enlargement, differed according to the species of animal, the character of the deficient diet, and the particular organ, not all the animals responding in the same degree when fed on the same diet. The adrenal glands, the most susceptible of all the endocrine organs to dietetic defects, were found to become enlarged as the result of all six classes of deficient dietaries and also in consequence of starvation. But the character of the enlargement varied according to the class of diet, both histologically and as regards adrenalin content—e.g., a scorbutic diet in guinea-pigs produced hæmorrhagic infiltration of the cortex, associated with a great reduction of the adrenalin content, whereas in pigeons autoclaved rice and butter gave rise to marked hæmorrhagic infiltration of the medulla and, as a rule, a low adrenalin content. With food deficient in vitamines and suitable protein and rich in carbohydrate, but well balanced with regard to proximate principles, the enlargement of the adrenals was less marked and the adrenalin content lower than when this balance was wanting, in the case of pigeons and monkeys. The quality of the food, therefore, governed the amount of adrenalin content, as also did concurrent infections. Œdema, usually hydropericardium, was often associated with enlargement of the adrenals, but did not occur in the absence of a corresponding increase of adrenalin content. It was found that the addition of fresh butter to a dietary of autoclaved rice lowered the incidence of œdema in pigeons, and appeared to afford complete protection up

to the thirty-sixth day of the experiment, after which, however, the butter gave no protection against the occurrence of *wet* polyneuritis, although some of the pigeons, 19 out of 29, had already developed *dry* polyneuritis.

The lowered incidence of œdema was associated with a lowered adrenalin content, yet an increase in weight of the glands occurred. The limitation of protection against wet polyneuritis to 36 days was attributed to the development of pathological changes in the digestive organs resulting from deficient dietaries and possibly from an inhibition of the assimilation of substances on which protection against œdema was dependent. Butter was also found to vary in its capacity to protect against œdema in pigeons fed on autoclaved rice, due probably to a difference in the lipochrome content of the butter, according to the particular fodder on which the cows providing the milk for the butter were fed. It was therefore suggested that the hypothetical "anti-œdema" substance might be of the nature of lipochromes.

Summarising the chief points of the results of his experiments Colonel McCarrison again drew attention to the changes in the adrenals, the character of whose enlargement varied with that of the dietetic deficiency. The adrenalin content also varied according to the diet, being in excess when food was deficient in vitamines and protein but rich in starch, below normal when the diet was scorbutic and when concurrent infections were associated with dietetic defects. He pointed out the important bearing of his observations on the causation of deficiency œdemas in the human subject. He regarded it as probable that interference with the normal excretion of urine by an excess of adrenalin reaching the kidneys favoured the retention of fluid in the tissues. As pointing in this direction he quoted human beri-beri with its associated adrenal enlargement and high adrenalin content and small output of urine, and alluded to the inhibition of the urinary flow by intravenous injection of an excess of adrenalin and the retention of NaCl caused thereby in the tissues. He maintained that as a channel of communication had been shown to exist between the kidneys and adrenals, the product of the glands might reach the kidneys without alteration in the general circulation, and thus control the excretion of urine. There followed, in consequence, the important fact that adrenalin was, in its turn, controlled by the quality of the food.

Additional factors doubtless played a part in the causation of œdema, such as impaired endothelial function, changes in vascular permeability, impaired metabolism of proteins and lipoids, and chemical changes in the tissues—all attributable to disturbed endocrine function and altered metabolism following on deprivation of vitamines and malnutrition.

In reply to points raised in the discussion which followed, by Dr. ANDERSON, Surgeon-Captain BASSETT-SMITH, Dr. LOW, Dr. MANSON-BAHR, and General HEHIR, Colonel MCCARRISON said that it was not known what particular deficiency of diet caused such specific effect as enlargement of the adrenals. He considered that the fatty degeneration of the adrenal cortex accounted for alterations in adrenalin content, but it was not known whether the cortical changes were toxic in origin. As regarded the condition of the liver following on use of deficient dietaries there was no great amount of atrophy measurable by alteration in weight; histologically there was congestion of the hepatic capillaries and degeneration of the liver cells. Depression of cellular function was the foundation of diseases of dietetic deficiency.

With reference to the causation of war œdema he was of opinion that its production was due to the mixed effect of a dietetic deficiency of vitamines and lack of protein, assisted probably by pathogenic agencies within the body. As to the influence of extra work in the presence of dietetic deficiency, he had found that the most active animals suffered earliest—as in the case of pigeons with polyneuritis—and so with dogs, who developed rickets earlier than other less active animals. He attributed this early response to the greater call on metabolism brought about by greater muscular activity

There was an exhibition of specimens in illustration of Colonel McCarrison's paper in the Pathological Museum.

Stibenyl in the Treatment of Trypanosomiasis.

Dr. MANSON-BAHR read the paper on his recent experiences with intravenous injection of stibenyl (acetyl-p-amino-phenyl stibiate of sodium) in the treatment of trypanosomiasis and kala-azar, which appears in our original columns.

Dr. ANDREW BALFOUR referred to the race for favour between emetine and antimony in the treatment of tropical disease, and sought information as to how antimony acted, whether the beneficial results were due to a direct parasiticidal or a more general action.

Colonel S. L. CUMMINS, A.M.S., alluded to the effect of antimony on pathogenic yeast, and inquired as to the possibility of its action directly on the organisms or on the tissues surrounding them.

Dr. MANSON-BAHR, in his reply, stated that emetine was not poisonous to *Entamœba histolytica* outside the body and that its beneficial action in tropical abscess might be attributed possibly to the effusion of serum which occurred into the abscess cavity, and thus killed the entamœba. He thought it probable that antimony compounds varied in their action according to the particular parasite, and that each kind of parasite required a special antimony preparation, as instanced in the case of bilharziasis, which responded to antimony tartrate, but not to stibenyl, whereas in trypanosomiasis antimony tartrate was badly tolerated and stibenyl promised excellent results.

Demonstrations.

The Section provided demonstrations during the afternoon sessions of June 30th and July 1st, which included—

1. Parasitic Worms, by Dr. R. T. LEIPER.

2. Exhibition of all known species of Tsetse Flies, including a consideration of their morphology and bionomics, by Professor R. NEWSTEAD.

3. Paintings illustrating the treatment of Leprosy by Chaulmoogra Oil, Soya Bean, Sodium Gynocardate, and Sodium Morrhuate, and the striking effect of the latter two drugs, by Sir LEONARD ROGERS.

4. The treatment of Bilharziasis by Intravenous Injections of Antimony Tartrate, by Dr. J. B. CHRISTOPHERSON. Two points were emphasised: (1) That antimony (pot.) tartrate given intravenously (*a*) kills the adult bilharzia worms, (*b*) kills and sterilises and arrests the ova which the worms have deposited, by killing the myracidium within the ovum; (2) that the operation of intravenous injection of antimony tartrate is a simple one, and is capable of being carried out as out-patient procedure on a large scale.

5. Microscopic slides illustrating Elephantiasis, and showing the histological changes in filarial obstruction of the lymphatic vessels, dead and calcified specimens of *F. bancrofti*, by Dr. MANSON-BAHR.

6. Malignant Malaria, by Dr. J. F. GASKELL, including preserved brain sections from a case of cerebral malaria which showed extensive punctate hæmorrhages; also microscopical slides and drawings of heart muscle and spleen showing degenerative changes and fibrous tissue-formation respectively, and in them the suggested nidus of the resting parasite. Slides and drawings were also exhibited of the development of the male and female crescents, and of the phases of the ring, schizont, and rosette formation coexisting in the same case, together with clinical details of a fatal case terminating suddenly from acute toxic effects, and of proportional counts of the number of parasites in the circulation per c.mm. exhibiting a fall coincident with intravenous administration of quinine.

7. Early stages in the life-history of *Ascaris lumbricoides* were demonstrated by Colonel F. H. STEWART, I.M.S., who explained the migration of the larva from the bowel via the portal circulation into the liver, thence by the venous circulation to the right heart, eventually through the pulmonary capillaries to reach the pulmonary alveoli and to regain the alimentary tract by way of the bronchial passages, trachea, pharynx, and œsophagus—a cycle

of events occupying a period of about ten days—at the expiration of which the larvæ appeared in the fæces. Microscopical sections were shown displaying the larvæ and the changes produced by them in the pulmonary alveoli and liver. The details of his work and experiments on animals were recently described in a paper read at a meeting of the Royal Society of Tropical Medicine and Hygiene.

8. Specimens and illustrations of various parasites and carriers of diseases affecting man and animals were exhibited by Professor NUTTALL, who also showed a collection of portraits of those who have advanced the subject of parasitology.

9. Demonstration of the use of the Mobile Laboratory for Malaria Inquiries in England by Lieutenant-Colonel S. P. JAMES, of the Ministry of Health.

10. A lecture, illustrated by lantern slides, on "Serbia under Typhus in 1915: the Story of a Great Epidemic and its Arrest," was given by Dr. W. HUNTER

EXHIBITION OF SURGICAL AND ELECTRICAL APPLIANCES, DRUGS, AND FOODS.

II. *Drugs, including Antiseptics—Continued from p. 140.*

The pharmaceutical products shown by the Anglo-French Drug Co., Ltd., of 238A, Gray's Inn-road, London, W.C., claimed much attention. These were chiefly of French origin, and included the arsenical compounds, galyl, novarsenobenzol, and glucarsenol, a glucose solution of the latter with analgesics. The visitors' attention was also drawn to the employment of stannoxyl—metallic tin and pure oxide—in staphylococcus infections, and a preparation called "elixir bromo-valerianate," odourless and tasteless, with or without strontium bromide is worthy of notice as an advance in pharmaceutical preparation. Modern organo-therapeutic products were well represented by the G. W. Carnrick Co., of New York, and 6, Northumberland-avenue, London, W.C. Hormotone, for example, is described as a combination of those hormones of internal secretion, which coöperate in maintaining the dynamic force of the organism, the sthenic as against the asthenic condition. Tryposegen, an extract of the pancreas, claiming to be useful in completing sugar metabolism in diabetic cases, was another item, and as well were shown specimens of various desiccated extracts, anterior pituitary, suprarenal, lymph, testicular, and so forth. The exhibit of Messrs. Howards and Sons, Limited, of Ilford and Stratford, was interesting. First in the list we may place agotan (2 phenylquinoline, 4 carboxylic acid) described as extraordinarily efficacious in eliminating uric acid from the system. Then they showed the hydrogenated derivatives of the cinchona alkaloids (hydroquinine, amongst others), which have been found by some to exhibit therapeutical advantages over their parent, the classic quinine of the materia medica, in malarial treatment. There was included the standard ether of this firm kept closely to physical constants, a proceeding clearly desirable in anæsthetic work.

It is noteworthy that the element sulphur should play an avowed part in the treatment of rheumatism and allied disorders, whether it be by Harrogate water, colloid, ichthyol, or the time-honoured mustard. These remarks are prompted by the special medical mustard bran prepared by Messrs. J. and J. Colman, of Norwich and Denmark-street, St. George's-street, London, E. This preparation is claimed to retain heat and moisture longer than other forms of poultice. Samples of mustard prepared particularly for use in the bath were also exhibited.

III. *Special Foods.*

Foods of particular interest in medical practice were not much in evidence, and, generally speaking, this division of the exhibition showed a small following compared with previous occasions. Experts in the preparation of special foods must have found considerable inconvenience by the restricted supply of raw materials through the war, and this fact may account for the small presentation. The chief interest lay in those foods which are claimed to contain the accessory food factors. The composition of some well-known foods peculiarly useful as accessories in infant feeding proves to have been based unwittingly on the inclusion of these factors.

Virol, for example, of Virol, Ltd., 152, Old-street, London, E.C., is presented in a new dietetic light when we consider that it is made up of marrow and beef fats, malt extract, eggs, lemon syrup, all including, with care in manufacture, the three vitamines unimpaired. Similarly, Messrs. Oppenheimer, Son, and Co., Ltd., of 179, Queen Victoria-street, London, E.C., exhibited samples of "roboleine" based on a collection of well-known materials bearing food accessory factors contained in malted barley, red bone marrow, and neutralised lemon-juice. The preparation is marked by an attractive palatability welcome to the growing child. Full-cream dry milk products were well exemplified in the exhibit of glaxo by the Glaxo Company of 155–157, Great Portland-street, London, W. This product shows the complete composition of cow's milk minus, of course, the 88 per cent. of water. A claim is made for its vitamine content. In addition to their well-known palatable starchless and sugarless foods for diabetic patients—bread, biscuits, cakes, preserves, and beverages—Messrs. Callard and Co., of 74, Regent-street, London, W., exhibited a new food preparation, vitmar, which we have already noticed in our analytical columns. While showing a high calorific value care has been taken to vitalise the preparation with all three accessory food factors founded on the use of ingredients containing them.

IV. *British Spas.*

The formation of a British Spa Federation will be welcomed as indicating the waking up of the authorities of our home watering-places to the health assets they possess. There was ample illustration of this in the exhibits of these resorts. Considering the limited area of our islands, the natural balneological resources are remarkable. There is Bath, with its impressive supply of hot water (120° F.) amounting to half a million gallons daily, and reeking with radium emanation. There is Harrogate, with its famous sulphur waters and its magnesia and chalybeate wells amidst a most attractive and health giving environment. There is Buxton, also situated amongst charming surroundings, with its thermal and radio-active springs. There is peaceful Cheltenham, with its natural aperient waters; Droitwich, with its brine wells; Woodhall Spa, with its saline water in which iodides count as important therapeutic constituents. Sulphur, again, is presented in the waters of Llandrindod Wells. All these establishments possess accessories in the shape of electrical apparatus, light and heat treatment, and mechanical balneological appliances, now recognised as giving relief in many cases. The authorities are realising also that régime is an important insistent in treatment, and that patients rightly expect healthy amusement and occupation to make their visit enjoyable as well as medicinal.

V. *Literary Exhibits.*

A much appreciated section of the exhibition was its literary side, comprising a group, so to speak, of small libraries presenting recent medical works, standard text-books, monographs, and so on. Amongst the publishers showing material in this division were: Messrs. H. K. Lewis and Co., Ltd., of 136, Gower-street, London, W.C.; the Cambridge University Press, of Fetter-lane, London, E.C.; Messrs. D. Appleton and Co., of 25, Bedford-street, London, W.C.; Mr. E. A. Brooke-Williams, of 8, Henrietta-street, London, W.C.; Mr. Edward Arnold, of 41–43, Maddox-street, Bond-street, London, W.; the J. B. Lippincott Co., of 16, John-street, Adelphi, London, W.C.; Mr. William Heinemann, of 20, Bedford-street, London, W.C.; the W. B. Saunders Company, Ltd., of 9, Henrietta-street, Covent-garden, London, W.C.; Messrs. Macmillan and Co., of St. Martin's-street, London, W.C.; Messrs. John Wright and Sons, of Bristol; the Oxford Medical Publications, of Warwick-square, London, E.C.; and Mr. H. R. Ellis, of 9, Lovell's-court, Paternoster-row, London, E.C. The collection was significant of a revival of medical literature since peace was established.

Public Health.

REPORT OF THE LONDON COUNTY MEDICAL OFFICER OF HEALTH AND SCHOOL MEDICAL OFFICER, 1919.

UNDER the above title Dr. W. H. Hamer has presented to the London County Council a combined report which, like its several predecessors, abounds with important considerations for the welfare of the dwellers in the metropolis. We give here a brief survey of its main features, reserving for future comment many important matters of detail.

By including his remarks on elementary education in the same volume with his advice as official guardian of the public health Dr. Hamer indicates his adherence to the conviction that the time-honoured system of separate treatment of these subjects is not only indefensible but actually wasteful. The recent decision of the County Council to amalgamate, under one administration, two previously independent departments has been abundantly justified by subsequent experience.

General Health Lessons.

In a prefatory note Dr. Hamer reviews the more important lessons inculcated during 1919 after five years of war and under the exceptional strain and stress then endured. In certain respects he regards 1919 as a record year. "The hand of war, famine and epidemic disease (he writes) was still outstretched over Central and Eastern Europe, though it is difficult to assess with any degree of accuracy the amount of misery and privation prevailing there. On the other hand, in the two largest aggregates of population—New York and London—the year was one of phenomenally low mortality. Conditions arising out of the war continued, in large measure, to dominate the situation throughout the world, though their effect upon the death-rates in 1919 was so dissimilar in the places above referred to." The experience of the last 70 years, in which hygiene and preventive medicine have made so much progress, shows that following upon a time of conflict and strife there almost inevitably succeeds an era not so much pacific as hypercritical, and Dr. Hamer is unwilling to follow the parrot cry of "physical deterioration" among the people. So far as infectious disease is concerned, he admits that it is the post-war period rather than the war period itself that threatens the safety of civilians dwelling outside the area of hostilities.

For nearly six years civilian migration into and out of this country has practically ceased. It is only now, nearly 18 months after the armistice, that there is any prospect of resumption of the pre-war movements of emigrants passing through London on their westward way. The year was essentially a period of transition from the war conditions of 1918 to so-called normal conditions towards the close of 1919. The majority of the war refugees were repatriated early in the year, and with the return of American and Colonial troops and the demobilisation of British forces there resulted, by the middle of the year, an addition of about 400,000 to the London population. It is therefore specially gratifying to learn that the mortality in the latter half of 1919 was lower than in any corresponding period for many years.

Infectious Diseases.

Taken as a whole, the year under notice was one of exceptionally favourable mortality, although there was considerable increase in the loss of life from influenza and allied causes in its first quarter. Except for a fortnight of cold and inclement weather in February the meteorological conditions were favourable to health. The exceptional immunity from infectious maladies experienced in the few years immediately preceding was not maintained in 1919; the number of notifications was, however, still below the average. *Diphtheria* showed increased prevalence, the attacks being in excess of those of any year since 1902. *Scarlet fever*, which had fallen to a minimum incidence in 1917, has since steadily increased, both in London and in the provinces, and there is now every prospect of another period of greater prevalence. *Typhus* was epidemic in many parts of Europe during 1919, but only two cases were notified in London. *Dysentery* caused 86 deaths, as against 313 in the previous year. *Enteric fevers* showed still further decline on the remarkably low rate of recent years. The low incidence of these diseases is the more remarkable because the population of London was, owing to demobilisation, temporarily increasing by immigration from all parts of Europe. But while the civilian community has escaped thus lightly, there was still unusual prevalence of typhoid in certain of the London mental hospitals, though the attacks there were less than half as many as those registered in 1918. The remarkable freedom of the army from this disease, as compared with earlier military experiences, has been widely ascribed to preventive inoculation. But on this point Dr. Hamer remarks that whatever the conclusion may be with regard to the soldiers, it is clear that this explanation cannot hold with regard to the civilian population, for only a small percentage of these were inoculated, and yet the number of attacks amongst them since 1914 has distinctly fallen.

Tuberculosis.—Among the civilian population the deaths referred to pulmonary tuberculosis numbered 5332, and to other forms of that infection 992, both these numbers being far below those of the previous year. The notified cases of "primary tuberculosis" totalled 15,587, a number below the average in the previous five years.

Influenza, cerebro-spinal fever, poliomyelitis.—In the last report Dr. Hamer suggested that "all the above-named forms of epidemic disease were manifestations of one and the same influence." This year he returns to his argument in favour of a common infecting agency in regard to the associated prevalence of disease, encountered coincidentally with influenza in its pandemic phase. Recent bacteriological literature encourages him to regard bacterial mutation as a phenomenon demanding careful investigation.

Birth-rate and Infantile Death-rate.

Estimates of the civil population have been based, since 1914, on the National Register of 1915, supplemented by information connected with the rationing of food. The civil population of London County thus estimated was 4,358,309 in the year under notice, an increase of 403,755 on the estimate of the previous year. The Registrar-General estimates the County birth-rate at 18·2 per 1000 living, as compared with 16·0 in 1918. A rapid increase in the registered births was noted in the latter half of the year, and in the closing weeks of that period the numbers far exceeded even pre-war figures. The civilian death-rate in 1919 is estimated at 13·6 per 1000, as compared with 19·2 in the preceding year. Among infants under 1 year the mortality was only 85 per 1000 births—the lowest rate on record. The notably light mortality from measles and whooping-cough largely accounts for this saving of infant life; but in addition to this the deaths from tuberculous and other respiratory affections were below the average, notwithstanding the influenza epidemic.

Medical Inspection and Treatment of School Children.

In this section Dr. Hamer gives an interesting account of the efforts of his department for the improvement of the health and physical condition of school children. The total number of children medically inspected during 1919, exclusive of scholarship children, was 265,230, compared with 255,631 in the preceding year. It is gratifying to note that with regard to more than three-quarters of the children entering school a parent interviews the doctor and obtains his advice concerning the precautions necessary in the interest of the child's health. The proportion of children found in need of treatment for physical defect was slightly lower than in the previous year. At routine inspections 83,007, or 42·6 per cent. of the children examined, were referred for treatment, as against 44 per cent. in the previous year.

From an instructive table the variations are shown in the condition of the children under the headings

of *clothing*, *nutrition*, and *cleanliness*. Based on the huge number of 200,000 examinations yearly these figures give valuable indications of the changes brought about in the condition of the people by varying economic and social influences. During the years of war this information became an encouraging feature, "demonstrating as it did that the children were not only shielded from the stress of war conditions, but that they were more tenderly looked after during those gloomy years than they had been in the previous piping times of peace." It is legitimate to dwell upon all improvements in the condition of children, but such improvement must not blind us to the ever present truth that there still are with us many children suffering from malnutrition, parasitic contagion, and ill-health. It is more than ever necessary to scrutinise these conditions during the difficult times through which we are passing or may be about to pass. In regard to *sufficiency of clothing* we learn that the percentage of children insufficiently clad was 2·5 in the year under notice, against 2·2 in 1918. Infants continue to be better cared for in this respect than older children, and girls are always better clad than boys. As to *nutrition* the condition of children progressively improved, until in 1918, as compared with the pre-war years, there were less than half the number of ill-nourished children in the schools. In 1919, however, there was perceptible deterioration of nutrition. It is to be feared that this must be attributed to the rise in price of the foods most needed by children, and notably in the cost of milk. In the year under notice 6·1 per cent. of the children were under-nourished, against 5·5 per cent. in 1918. As regards *personal cleanliness* and measures for securing *freedom from verminous infestation* the report is very instructive. In 1916 and 1917, for example, the percentage of 8 year old girls with heads free from parasitic infection was 68·8, whilst in 1919 it was 74·2. Striking improvement at other ages is also recorded during the last two years. It is clear, however, that the time has not yet arrived when the campaign against these dirt conditions can with safety be relaxed.

Institutions for medical treatment.—At the close of the year under review there were 57 centres actually at work for the treatment of school children. The total number of cases for which facilities are thus provided was 174,878. These figures may be compared with the 42 centres providing for 99,000 cases in 1914 or with the 17 centres providing for 26,000 cases in 1910, the year in which the medical treatment scheme was inaugurated.

URBAN VITAL STATISTICS.

(Week ended July 17th, 1920.)

English and Welsh Towns.—In the 96 English and Welsh towns, with an aggregate civil population estimated at nearly 18 million persons, the annual rate of mortality, which had been 10·1, 9·9, and 9·9 in the three preceding weeks, was again 9·9 per 1000. In London, with a population of nearly 4½ million persons, the annual death-rate was 10·1, or 0·5 per 1000 above that recorded in the previous week, while among the remaining towns the rates ranged from 2·8 in York, 3·4 in Lincoln, and 3·9 in Ilford, to 15·3 in Merthyr Tydfil, 15·7 in Sunderland, and 17·5 in Wolverhampton. The principal epidemic diseases caused 180 deaths, which corresponded to an annual rate of 0·5 per 1000, and comprised 68 from infantile diarrhœa, 34 from diphtheria, 33 from measles, 30 from whooping-cough, 12 from scarlet fever, and 3 from enteric fever. Measles caused a death-rate of 1·6 in Wolverhampton, 1·7 in Stockton-on-Tees, and 1·8 in Northampton; and whooping-cough of 1·3 in Gateshead and 1·5 in Merthyr Tydfil. There were 1855 cases of scarlet fever and 1582 of diphtheria under treatment in the Metropolitan Asylums Hospitals and the London Fever Hospital, against 1755 and 1599 respectively at the end of the previous week. The causes of 22 of the 3381 deaths in the 96 towns were uncertified, of which 4 were registered in Birmingham and 4 in Gateshead.

Scotch Towns.—In the 16 largest Scotch towns, with an aggregate population estimated at nearly 2½ million persons, the annual rate of mortality, which had been 11·5, 11·1, and 12·1 in the three preceding weeks, fell to 11·1 per 1000. The 268 deaths in Glasgow corresponded to an annual rate of 12·6 per 1000, and included 4 each from small-pox and infantile diarrhœa, 3 from whooping-cough, and 1 each from measles and scarlet fever. The 66 deaths in Edinburgh were equal to a rate of 10·1 per 1000, and included a fatal case each of measles and diphtheria.

Irish Towns.—The 125 deaths in Dublin corresponded to an annual rate of 15·7, or 1·5 per 1000 above that recorded in the previous week, and included 4 each from whooping-cough and infantile diarrhœa and 2 each from measles and diphtheria. The 94 deaths in Belfast were equal to a rate of 11·9 per 1000, and included 2 each from enteric fever and infantile diarrhœa and 1 from scarlet fever.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

Surg.-Cmdr. J. St. J. Murphy placed on retired list medically unfit.

ARMY MEDICAL SERVICE.

Major-Gen. S. Macdonald retires on retired pay.

ROYAL ARMY MEDICAL CORPS.

Capt. F. C. Davidson retires, receiving a gratuity, and is granted the rank of Lieutenant-Colonel.

Lieut. W. H. Palmer to be Captain.

Officers relinquishing their commissions:—Temp. Capt. A. Brown (granted the rank of Lieutenant-Colonel). Temporary Captains granted the rank of Major: A. C. Norman, W. Dunlop, G. Young. Capt. W. H. Palmer (retains the rank of Captain). Temporary Captains retaining the rank of Captain: S. P. Hyam, J. E. Kesson, J. P. Howe, R. T. G. Aickin, W. Leslie, A. Morrison, M. A. MacDonald, W. W. Morrison, J. W. Robertson, G. B. Egerton, L. J. F. Bull, M. McGillivray, H. Morley, E. ff. Creed, I. M. Robertson, T. H. J. Douglas, B. Sergeant, J. M. H. Campbell, J. B. Kirk, D. C. Buchanan, J. Irving, E. J. Coombe, R. Hilliard, G. P. W. Staunton, J. K. T. Mills, G. P. N. Richardson, C. G. Coombes, J. H. Thomas, R. T. Lewis, C. C. Harrison, W. D. Miller, J. R. Harris, W. Dempster, W. M. Jones, R. W. H. Miller, H. W. Lewis, G. M. Herriott, R. Thom, C. V. Pink, L. P. Johns, P. D. McLaren, O. St. L. Campion, C. V. Pearson, W. R. McLinden, H. St. H. Vertue, W. Oats, F. B. Jago, R. H. Chadwick, W. F. Kivlichan, T. R. Wilson, H. N. Pritchett, C. E. H. Paley, M. M. Frew, W. B. Bannerman, G. de H. Dawson, A. Coupe [on ceasing to be employed as a Dental Surgeon). Temp. Lieut. J. C. J. Callanan (retains the rank of Lieutenant).

Oversea Forces: South African Medical Corps.—The undermentioned relinquish their temporary commissions on ceasing to be employed: Lieut.-Col. Sir E. N. Thornton (retains the rank of Lieutenant-Colonel); Capts. H. R. J. Sutton (granted the rank of Major) and R. P. Mitchell (retains the rank of Captain).

The undermentioned relinquish their commissions on account of ill-health: Major M. R. C. Hoare (retains the rank of Major); Capts. P. D. Hamilton and H. J. Orford (granted the rank of Majors) and Capt. R. I. Wolfe (retains the rank of Captain).

Temp. Capt. J. M. Mitchell, R.A.M.C., has been appointed an Officer of the Military Division of the Most Excellent Order of the British Empire for valuable services rendered in connexion with military operations in South Russia.

SPECIAL RESERVE OF OFFICERS.

Capt. B. W. Brown relinquishes his commission and retains the rank of Captain.

TERRITORIAL FORCE.

Capt. F. E. Stokes to be Major.

Capt. S. S. Greaves to be Deputy Assistant Director of Medical Services, West Riding Division.

Major H. Fulton resigns his commission and is granted the rank of Lieutenant-Colonel.

Capt. (acting Major) E. G. T. Poynder relinquishes the acting rank of Major.

Majors resigning their commissions and retaining the rank of Major: G. W. Fitzgerald and H. A. T. Fairbank.

Capts. O. L. Rhys and A. C. F. Turner resign their commissions and are granted the rank of Lieutenant-Colonel.

Captains resigning their commissions and granted the rank of Major: W. V. Wood, J. H. Lloyd, S. H. Rentzsch, W. B. Hill, S. R. R. Matthews, C. E. W. MacDonald, and R. G. Dixon.

Captains resigning their commissions and retaining the rank of Captain: T. I. Mills, H. W. Bayly, E. H. Coyne, D. Davidson, C. W. Fort, P. McRitchie, C. P. Sargent, and A. C. Wilson.

2nd Western General Hospital: Capt. G. E. Loveday resigns his commission and retains the rank of Captain.

1st Eastern General Hospital: Capt. W. L. Murphy resigns his commission and retains the rank of Captain.

1st Scottish General Hospital: Major Sir H. McI. W. Gray resigns his commission and is granted the rank of Colonel.

Lowland Divisional Sanitary Section: Capt. T. J. Mackie resigns his commission and retains the rank of Captain.

TERRITORIAL FORCE RESERVE.

Col. D. W. C. Jones resigns his commission and retains the rank of Colonel.

Capt. E. G. Gauntlett resigns his commission and is granted the rank of Major.

Capts. B. K. T. Collins and C. C. Ling resign their commissions and retain the rank of Captain.

ROYAL AIR FORCE.

Capts. J. P. Hennessy and J. Chambre are transferred to the unemployed list.

Correspondence.

"Audi alteram partem."

THE MYOCLONIC FORM OF ACUTE EPIDEMIC ENCEPHALITIS.

To the Editor of THE LANCET.

SIR,—Probably one of the earliest recorded cases of the condition in this country was the one shown at the meeting of the Section for the Study of Disease in Children of the Royal Society of Medicine on Jan. 24th, 1919. The child, a little girl of 2 years 11 months—curiously enough, an Italian—was under my care at the Hospital for Sick Children, Great Ormond-street, in 1918. Some Fellows of the society held the case was an encephalitis, I maintained it was a myoclonus multiplex, knowing that this was a safe position, since neither the cause of encephalitis nor myoclonus was absolutely clear. The onset was abrupt and the case described in fair detail in the *British Journal of Children's Diseases*, Vol. XVI., No. 187–189, pp. 156–157. It would appear both views were correct—an amiable solution. I followed the case to a fair recovery 18 months later.—I am, Sir, yours faithfully,

F. JOHN POYNTON, M.D.

Devonshire-place, W., July 21st, 1920.

To the Editor of THE LANCET.

SIR,—The cases described by Dr. A. W. M. Ellis in THE LANCET of July 17th are less novel in England than may be thought. Dr. W. B. Russell, for example, described one in your columns in 1918 (July 27th). But, as a matter of fact, when acting as medical registrar at the London Hospital in 1918 I saw many such. Unfortunately, owing to the precipitancy with which the name "encephalitis lethargica" had been adopted by the Local Government Board, and the early and resolute conviction of so many that we had to deal with an affection of which lethargy was the specific index, it became extremely difficult to excite interest in the myoclonic phenomena of lethargic cases, or in those cases with no lethargy but much myoclonus. It was, indeed, not realised that we had to do with a perfect shower of cases exhibiting, severally and collectively, almost every conceivable manifestation of acute encephalomyelitis and meningitis. However, at the discussion on Epidemic Encephalitis at the Royal Society of Medicine (Oct. 15th, 1918) I stated that, of 127 cases seen in the first half of the year (of which 120 were at the London Hospital), 15 manifested epileptiform "fits," 2 showed marked trismus, and 22 tremors, twitchings, or chorea in a marked degree. These statements excited obvious risibility, but I have the full notes still in my possession. Moreover, I pointed out that of 51 cases submitted to lumbar puncture 4 showed cerebrospinal leucocytosis in excess, and 2 others in marked excess, whilst some lymphocytosis was present in 31.

In an earlier communication[1] it had been already suggested that, as now generally recognised, cell excess in the cerebro-spinal fluid from cases of encephalomyelitis is related to the extent and degree of meningeal implication present. But, in a personal letter to me, dated June 19th, 1918, the late Sir William Osler, after writing what I cannot forbear to repeat—that the paper just referred to was "the most sensible thing written on the subject"—went on to say that "encephalitic features of this outbreak are most interesting, *particularly* the choreiform movements and incoördination."

Sir Willian Osler, who lectured at Oxford on this myoclonic form in June, 1918, brought all these cases, whether lethargic or convulsive, together with acute anterior poliomyelitis, under the same heading—acute epidemic encephalo-myelo-meningitis. And it is this view which is destined to prevail. The epidemiological phenomenon remarked by Dr. Ellis (the "tendency of the virus to new localisation") is, of course, quite familiar in respect of many epidemics. In some epidemics of diphtheria, for example, many cases are nasal; in others there is a high percentage of laryngeal cases; in others, again, there is much paralysis of this, that, or the other type. And the historical records of epidemic encephalomyelitis and meningitis show, clearly what Wickman proved for the limited Heine-Medin conception; that, though in each epidemic all types are recognisable, nevertheless in different epidemics different types preponderate. The old Kriebel-krankheit and Willis's convulsive fever of 1661 were of the myoclonic type, but Saillant, in 1776, hit the nail on the head when, in describing the "*maladie convulsive épidémique attribuée par quelques observateurs à l'ergot*," he pointed out that, in successive epidemics, the clinical phenomena tend to assume different forms.

All the forms noticed and described by me at the London Hospital in 1918 have since been described by different authors as "new affections" or "new types," and it was a case of the myoclonic type which, becoming certified as "acute delirious mania," convinced me of what I had long suspected—that Luther Bell's disease—"acute delirious mania"—is but an encephalitis occurring during influenza periods, with psychical symptoms paramount.

I am, Sir, yours faithfully,

Wimpole-street, W., July 19th, 1920. F. G. CROOKSHANK.

[1] THE LANCET, 1918, i., 699.

To the Editor of THE LANCET.

SIR,—I am grateful for the excellent account by Dr. A. W. N. Ellis of three fatal cases of acute epidemic myoclonic encephalitis in your last issue. After reading most of the available literature on the subject of acute encephalitis lethargica (in the English language), and observation of some cases in my practice during the first three months of the year, and a few cases of the myoclonic variety in consultation with some of my colleagues during the last three months, I am still far from being convinced that the disease is a distinct entity of its own.

From purely clinical observations of the cases seen by me, with no available opportunities for the more thorough study of them, such as blood examinations, chemical and pathological examinations of the urine and cerebro-spinal fluid, &c., I have yet to be convinced that these conditions are not really influenzal or post-influenzal manifestations. The cases observed by me in the early months of this year were to me obviously influenzal. In one of the cases a condition of marked myoclonus of one upper limb was a distinct sequela a week or so after the patient recovered from his lethargy. In another persistent vomiting was present, which soon only manifested itself when the patient moved her head to one or other side. This then improved, and for a further 10 to 14 days she only vomited if she sat up in bed. I saw a very similar case to the latter with a colleague only last week.

In 1903, whilst engaged as assistant in a large industrial area during an influenza epidemic not of a virulent type, I had one instance of the same myoclonic condition in the left arm as asequela, which ultimately disappeared with no special treatment.

I have just received the current number of the "Medical Clinics of North America." The first article is devoted to "Encephalitis Lethargica," written by no less an authority on nervous diseases than Dr. Charles Louis Mix, of the Mercy Hospital, Chicago, and in discussing the ætiology he states as follows: "Personally, I am of the opinion that although the germ of encephalitis lethargica has not been discovered, it is nevertheless a post-influenzal affair." The publication of further cases of encephalitis lethargica, whether "myoclonic" or "amyoclonic," with the available minute examinations and equipment necessary for their detailed study, will undoubtedly pave the way for a thorough and complete knowledge of the ætiology and pathology of these most interesting conditions.

I am, Sir, yours faithfully,

July 19th, 1920. GENERAL PRACTITIONER.

SETTLEMENTS FOR CONSUMPTIVE EX-SERVICE MEN.

To the Editor of THE LANCET.

SIR,—In the *Ex-Serviceman* a discussion has been going on for some time as to the inadequacy of the after-care provision for tuberculous ex-Service men after they have left the sanatorium. A suggestion has been made by a gentleman writing from the Royal Colonial Institute that a colony should be founded in some of our overseas possessions to which suitable men with arrested or quiescent lesions might be sent. Jamaica is said to be an ideal place for the consumptive settler; not in the plains but high up in the Santa Cruz mountains, near Malvern. If the scheme matures the question of funds may bar it. Would Dr. Batty Shaw consider this a suitable opportunity to test the value of a tuberculosis settlement in a dry warm climate, where the chance of mixed infections and catarrhs of the lung would be minimal? I refer to his instructive lecture reported in THE LANCET of Jan. 24th last.

I am, Sir, yours faithfully,

J. PIRIE, M.D.

Moorlands, Canford Cliffs, Bournemouth, July 18th, 1920.

HIBERNATING MOSQUITOES AS CARRIERS OF MALARIA.

To the Editor of THE LANCET.

SIR,—Will you kindly permit me to endorse Colonel S. P. James's remarks contained in your issue of July 10th (p. 99) regarding the importance of Dr. C. M. Wenyon's observation that in the Balkans anophelines with partially developed malaria zygotes hibernate there in the winter. So far as the epidemiology and preventive measures of malaria in India are concerned, this observation may be one of primary importance.

I have elsewhere expressed the opinion that in many stations of the United Provinces and Punjab in India infection through anophelines occurs for one or two months during the late spring and early summer if in March or April there happen to be some heavy falls of rain. This means that under these circumstances there may be two malarial seasons in such places—one, which is short, in the late spring and early summer, and the usual one during and after the monsoons have begun. When this observation was originally made I could give no evidence in support of it except that of the malaria statistics of certain districts and the existence of breeding-grounds of anophelines, in which their larvæ were found during the period specified at several stations; it should not be difficult to prove or disprove in such places, as there are always in existence breeding grounds for anophelines and cases of residual malarial infection. Further work from, say, the middle of March to the middle of May should elicit whether this is actually the case or not, and whether malaria-carrying species of anophelines disseminate malaria at that particular time of the year. This could be ascertained by taking a sufficient number of anophelines in native huts at that time and determining the sporozoite-rate.

I have also noted that there are some stations in which the winged malaria-carrier cannot be found after Oct. 15th, others in which it may be found at the end of October and well into November. In all stations in Northern India a certain number of anophelines continue on the wing and carry malaria for weeks or even months after the breeding season is over. For the observations that led to my originally expressing this latter opinion I was indebted to a suggestion contained in that excellent book, "The Practical Study of Malaria," by J. W. W. Stephens and S. R. Christophers. When these statements were made it never struck me that anophelines could hibernate in the infected state throughout the winter, and I believe that as regards India this has not hitherto been suggested, or I have not come across it if it has. Several malariologists in India have advocated the destruction of hibernating mosquitoes with the view to reducing the numbers that would come into operation when the breeding season began again, but not with the idea that some of these hibernating insects were already infected. The hibernation of adult anophelines on the plains in India is carried out mainly in secluded sheltered corners of houses, under surface of shelves, unused almirahs, up chimneys, in store-rooms, stables, servants' out-houses, in huts of bazaars, in cow-byres, and old ruins, in which these mosquitoes creep into cracks that often appear too small to give them admission. There would be no difficulty in collecting these, and if they are malaria-infected estimating the zygote-rate for each month during the hibernating period.

In India we have been in the habit of considering that the cases of spring malaria occur as relapses of old infections brought on by the chills due to lowered atmospheric temperature and winds associated with the "spring-crops showers" of March and April, and that these residual malaria cases then form the reservoirs from which the new broods of anophelines disseminate infection. Colonel James, in his recently published book, "Malaria at Home and Abroad" (which should be considered a *vade mecum* by all practical investigators of malaria), states at p. 94 "..... as regards initial malaria in England in 1918 ..... there are records of a few new infections as early as May. ..... An infection in May or earlier must have been due to an anopheline which has lived through the winter, for in that year the first brood of new adult anophelines did not appear until quite the end of the month. The particular anopheline concerned might have become infected in the previous autumn and lived through the winter with sporozoites in its salivary glands, or, as was suggested by Captain Macdonald, R.A.M.C., it might have been wintering in an artificially heated room occupied by a malaria carrier." Several important suggestions are embraced in these remarks. It is too late to start observations in India regarding anophelines that possibly hibernated in the infected state last winter, but it is not too early to commence organising a series of investigations for the ensuing cold weather that would settle this highly important question once for all as regards that country.

In general terms it may be stated that up to date in India antimosquito measures are closed down when the breeding season of mosquitoes terminates, and, as a rule, not recommenced until the ensuing rainy season. If it is found that some of the malaria-carrying species of anophelines do hibernate in the infected state our position in connexion with antimalarial measures is greatly strengthened and a new line of defence is opened out—that of devising measures of destroying them in their winter quarters. Special interest will be felt in Dr. Wenyon's promised paper on his experiments in connexion with hibernating infected anophelines in the Balkans.

I am, Sir, yours faithfully,

P. HEHIR,

London, July 12th, 1920. Major-General, I.M.S. (ret.)

FUNCTIONAL NERVOUS DISORDERS.

THE CAUSAL FACTORS.

To the Editor of THE LANCET.

SIR,—It is unfortunate that Dr. Judson Bury in your issue of July 10th did not define the neuroses that he dealt with in his paper on the Physical Element in the Psycho-neuroses. He described hysteria and neurasthenia, but ignored psychasthenia. Let us, therefore, turn to the simplest definition and classification, that of Purves Stewart:—

(*a*) *Neurasthenia.*—A disease resulting from the hypersecretion of the endocrine glands, the stimulation of which may be physical (toxæmia, trauma, &c.) or psychical (worry, fright, &c.). If we accept this definition, and I cannot see how we can do otherwise, we can at once see how a long past stimulus is capable of being a causative agent in a present neurosis; thus: stimulus —> hypersecretion of adrenals —> "quicker living" —> exhaustion and consequent demand for more secretion —> hypersecretion, and so on.

(*b*) *Hysteria.*—Purves Stewart accepts Hurst's definition:—

"That hysteria is a condition manifesting itself by symptoms which can be reproduced by suggestion, and which can be made to disappear again by persuasion and suggestion."

Dr. Bury does not; but as he fails to give us anything in its place, we may for the purpose of this argument adhere to Hurst's ideas.

(c) *Psychasthenia.*—As Dr. Bury does not mention this neurosis we need not deal with it here.

It will be noted that the conditions known as "anxiety-neurosis," "conversion hysteria," &c., are included in the above; and, surely, rightly so. For instance, anxiety is a symptom present in all the psychoneuroses; if it predominate in any one case, why label the ailment "anxiety-neurosis" and push it into a class by itself?

Let us now see wherein those who claim "mental factors as much more important than bodily" differ from Dr. Bury.

Neurasthenia.—So far as I am aware psychotherapy does not claim to be able to cure this disease; moreover, the vast majority of psychotherapists are in practical, if not entire, agreement with the paragraph on the biochemic aspect. In fact, we can say that neurasthenia is not a true psychoneurosis; it is an organic disease which will yield, not to psychotherapy, but to "fresh air, sunlight, cheerful surroundings, and light work"; in two words, physiological rest. However, "anxiety states" so often occur in true neurasthenia that psychotherapy is a useful adjunct in treatment.

Hysteria.—Dr. Bury describes an illustrative case and then develops his argument that the causative factor is physical and in the nature of a "synaptic breakdown." Possibly; but may I suggest that he observe his patient when recovering from a general anæsthetic, or better still, under hypnosis? In similar cases, when there has been any reason to anæsthetise them, I have always found that the nervous elements involved were intact. For example, I have in my care at present a patient who is stone deaf, and also afflicted with such a spasmodic stammer that he is practically dumb. Note that here we have not only muscles involved, but also a special sense.

A few days ago I anæsthetised my patient deeply, and then, as he was coming round, I began talking to him in an ordinary conversational tone. After a little while he replied when called by name, and finally, when I told him to converse with an orderly by the bedside, he did so. At this time his hearing was perfect, and so was his speech. A few minutes later, as he recovered from the anæsthetic, his hearing and speech left him in the middle of a sentence. Now, are we going to say that this man is suffering from a "block in his synaptic connexions"? How can an anæsthetic remove this block? (Note that at the time of the "recovery" the patient was only *partially* and lightly "under.")

How can the "synaptic block" act so that return to consciousness was accompanied by a dramatic relapse? Is it that this man is a malingerer? Well, he has been under close observation for five months, not only by M.O.'s, but also by orderlies, and not a shred of evidence that he is a malingerer has been noted; moreover, from a disciplinary point of view he is an excellent patient. Personally, I fully believe that he has no conscious control over his ailment, and I cannot see how the causal factor can be anything but psychical.

I am, Sir, yours faithfully,

A. G. MIDDLETON,
Medical Superintendent, John Leigh Memorial Hospital (Neurological), Brooklands, Cheshire.

July 15th, 1920.

A PLEA FOR A UNIFORM PSYCHOTHERAPY.

To the Editor of THE LANCET.

SIR,—Of recent years, more especially since the war, the treatment of disorders of functional origin has been occupying an ever-increasing amount of medical and public interest. For the practitioner in general work the nomenclature employed by psychopathologists must be bewildering. Not only does this apply to the terms in use for describing the disorders themselves, but to the mechanisms producing these disorders, and even the methods of treatment are described by authors belonging to different schools of thought in language the meaning of which varies with the individual writer.

One reason for this, although perhaps not the only one, is that the work of Freud, Jung, Adler, and others has laid stress upon an entirely new conception of the mind—namely, the "unconscious." As Mr. Tansley points out in his recent book, psychology, prior to the work of the psycho-analytic school, concerned itself mainly with the study of the mind by introspection, and therefore dealt only with facts of phenomenal consciousness. Of recent years, however, the results of this form of investigation have failed to satisfy even the academic psychologist, so that he, in common with others, has sought for psychological conceptions yielding results of a more practical nature. The widespread interest aroused by the conception of an area of the mind outside consciousness, which directs and governs consciousness, seems to be the result of this discontent. In this country, as well as on the continent, numbers of books have been written dealing with the mental mechanisms first outlined by Professor Freud, and with the views of his adherents and opponents. Such books are either purely psychological or designed for the better understanding of nervous disorders, in which case they are of direct interest to every medical man called upon to treat patients so suffering.

Prior to 1914 psychopathology and psychotherapy were studied by few medical men, and treatment of functional disorders by mental medicine was carried out by a relatively few physicians. At the present time, however, there are a large number of individuals, both within and without the profession of medicine, who essay to treat derangements of nervous origin by means of psychotherapy. It is obvious that treatment should be carried out by those trained in the practice of medicine rather than by members of the laity, whose experience is often confined to the perusal of psychological treatises, and this if only for diagnostic reasons. The importance of this will probably be sufficiently emphasised by referring to an article by Dr. Judson Bury in the issue of THE LANCET of July 10th. This author lays stress upon the physical element in the causation of the psycho-neuroses; and I venture to think that this aspect of the subject must perforce be overlooked by the layman who treats patients by psychological means. But the majority of medical men, whose experience of the treatment of these disorders makes their opinion of value, are agreed, I believe, that in psycho-neuroses, certainly of any long standing, both physical and psychical changes are generally obvious, and that treatment, therefore, need not be confined to one method.

If, therefore, it is agreed that treatment by psychotherapy is better carried out by qualified practitioners, it is necessary that medical men should be conversant with a nomenclature in general use and should be able to form some judgment as to which patients are suitable for psychotherapeutic treatment, either by the doctor himself or by a specialist. At the present time, however, conflicting statements on this subject appear almost every week in the medical journals; and it is no uncommon occurrence for the same number of a journal to contain two articles on some aspect of this subject, which are not only written by authors whose views are diametrically opposed, but which are even in violent opposition. The strides which psychological treatment has made of recent years are, of course, so rapid, that difference of opinion must of necessity exist about much technique which is still sub judice. But even with this allowance, the marked difference of opinion which is expressed makes it difficult for practitioners to decide first, whether any psychotherapy is useful, and, secondly, whether the suggestionist, persuasionist, or psycho-analytic school is justified in the claims each makes for its own vaunted method.

Difference of opinion must perforce exist on many subjects connected with a profession such as medicine, which is really in its practice an art more than a science. But such direct contradictions as exist on this subject are surely capable of some adjustment, and the object of this letter is to plead, primarily, for a single nomenclature for functional disorders and their treatment. This would seem to be the starting-point for a scheme more acceptable to the bulk of medical psychologists, and hence a better understanding by the general practitioner of the aims and capabilities of the psychotherapist. It is impossible for the busy doctor to make himself conversant with the claims made by

the Viennese and Zurich schools, or to contrast these with the indictments launched by those who still regard the psychoneuroses as mainly or entirely physicogenic. As a result many patients are recommended for a particular variety of psychotherapy who would never be so advised were the limitations of the treatments included under this term more generally understood.

On the other hand, many functional ailments continue to exist under the inadequate attack of drugs, electricity, and massage which could be conquered with ease by a suitable psychotherapeutic procedure. Of these two classes, I am inclined to think that the latter is the larger and more important.

The physico-genic school, to whom psychotherapy is synonymous (certainly in many instances) with moral encouragement and occupation, is imbued with the idea that every medical man can and does practise psychotherapy when he encourages and exhorts his patient, but that beyond this the specialist can do little. Another belief of many is that only "hysterical" or weak-minded individuals are suitable for this method of treatment. In other words, that every person requiring such help must perforce be what has sometimes been dubbed a "degenerate." Every specialist is assumed to have some special knowledge and skill in the practical side of his craft, if only by the constant practice which brings experience in its wake; and we learn to cure by curing, whether we do so by surgical or mental operations. The sole fallacy of this argument might be found in the belief that no especial technique existed for a mental operation, if this belief could be established as a fact. This is, however, far from the truth, as all who have practised psychotherapy know. It matters not whether he believes in the artificial dissociation provided by hypnosis, or the associationistic delving of analysis, the physician who operates on the mind learns that the technique which suits him is the technique which cures his patients. We may assume, therefore, that the experienced psychotherapist has acquired some skill which makes him especially able to treat his patients.

The services which psychotherapy can perform will never be successfully decried by those who can only think in terms of protoplasm; its development is more likely to be delayed by internecine strife and by the bitterness of opposing schools. This letter is a plea for a more uniform nomenclature, for a better understanding of a rational psychotherapy, and for a wider use of the methods included under this term.

I am, Sir, yours faithfully,

IVO GEIKIE COBB.

Queen Anne-street, W., July 14th, 1920.

THE CLINICAL DIAGNOSIS OF DIPHTHERIA.

To the Editor of THE LANCET.

SIR,—I shall be obliged if you will publish this, my final contribution to the discussion, *re* "The Clinical Diagnosis of Diphtheria." Any further correspondence would, I feel, be a waste of time, energy, and paper; for Dr. A. K. Gordon's views differ so widely from my own. What I have published has been an exact record of my personal experience. Dr. Gordon says his experience has been different, and his statement must be accepted as true, though it follows that the clinical features of faucial infections must be different in Manchester from what we see in North Wales.

I am glad to find Dr. Gordon saying (near the end of his letter) that "he holds clinical and bacteriological diagnosis to be equally essential because one supplies the deficiencies of the other." Now, Sir, that is precisely my own view, and I have distinctly stated that I employ both methods. My point is that diphtheria can be diagnosed without bacteriology. Dr. Gordon, I think, takes the opposite view, in spite of the fact that Pierre Bretonneau diagnosed and described diphtheria in 1826, about 57 years before the causative germ was discovered by Klebs (1883), and many years before "germs" were suspected of causing any zymotic disease.

I am, Sir, yours faithfully,

Wrexham, July 16th, 1920. H. DRINKWATER.

Parliamentary Intelligence.

NOTES ON CURRENT TOPICS.

THE Standing Committee of the House of Commons, to which the Dangerous Drugs Bill has been referred, met on Tuesday, July 13th, and Wednesday, July 14th. The object of the Bill is to carry out the Government's obligation under the Treaty of Versailles to bring the International Opium Convention into force. On both occasions the Committee failed to start work owing to the lack of a quorum. After waiting some time in the hope of a quorum being obtained, the Chairman, Colonel W. G. NICHOLSON, said that the Bill would go to the bottom of the list before the Committee.

HOUSE OF LORDS.

THURSDAY, JULY 15TH.

Veterinary Surgeons' Amendment Bill.

The Veterinary Surgeons' Act (1881) Amendment Bill was read a third time and passed.

HOUSE OF COMMONS.

WEDNESDAY, JULY 14TH.

Typhus Cases in the Black Sea.

Lieutenant-Commander KENWORTHY asked the First Lord of the Admiralty whether His Majesty's seaplane-carrier *Ark Royal* had been used for carrying refugees who were typhus cases in the Black Sea; how many times she had been so used; whether she was disinfected immediately after each voyage; how many cases of typhus there had been among the crew of this ship; how many of the crew had died; and why properly fitted hospital ships were not used for this purpose.—Mr. LONG replied: His Majesty's seaplane-carrier *Ark Royal* was used on one occasion for carrying refugees who were typhus cases in the Black Sea. She was disinfected immediately afterwards. There were 16 cases of typhus fever among the crew in the *Ark Royal*, of whom 8 were landed at Batoum on May 14th last; 5 more landed and sent to the 82nd General Hospital, Constantinople, on May 17th; 1 (Mr. Scott, Warrant Engineer) was also sent to this hospital on May 19th; 1 on May 20th; and 1 on May 27th sent to the 20th Stationary Hospital. Two deaths were reported—namely, Mr. Scott, Warrant Engineer, and Chief Shipwright C. Mattinson. The only hospital ship was not at that time available, and the urgency of evacuation necessitated the use of all available craft.

Cost of Poor-law Relief.

Mr. SWAN asked the Minister of Health if he could state the present average cost of paupers under the Poor-law.—Dr. ADDISON replied: Statistics showing the cost at the present time are not yet available, but in the year 1918–19 the average weekly cost per person in receipt of relief in England and Wales was approximately as follows:—Institutional relief: in infirmaries, 34*s.* 1*d.*; in separate schools and other institutions for children, 18*s.* 2*d.*; in general institutions, 20*s.*; domiciliary relief, 5*s.* 1*d.*

Glasgow Vaccination Statistics.

Mr. ROBERT YOUNG asked the Secretary for Scotland whether he could state what was the total number of small-pox patients admitted to Belvedere Hospital, Glasgow, since the recent outbreak, and of that number how many had been vaccinated in infancy and since, and how many had never been vaccinated; and whether the number of deaths which had taken place were entirely those of vaccinated persons.—Mr. MUNRO replied in a written answer:—

Small-pox in Glasgow to July 12th, 1920.

Age period.	Unvaccinated.		Vaccinated.	
	Cases.	Deaths.	Cases.	Deaths.
Under 10 years	71	16	8	Nil.
Over 10, under 20	12	4	74	2
Over 20	5	1	182	29
Totals	88	21	264	31

Total cases admitted to Belvedere Hospital 352
Total deaths 52

Of the vaccinated cases 15 have been revaccinated since infancy. Two of these are said to have been revaccinated in 1916, but there is no visible evidence of this.

Third London General Hospital and Tuberculosis.

Mr. GODFREY LOCKER-LAMPSON asked the Minister of Health whether, in view of the treatment urgently required for ex-military and other local tuberculous patients, the

London County Council were desirous of taking over the completely equipped wards in the ground at the back of the 3rd London General Hospital on their vacation by the military authorities at the end of July; whether the London County Council were prevented from doing so by provisions of the Defence of the Realm Act, under which it was obligatory that these huts should then be dismantled and broken up; whether the erection of similar wards elsewhere would cost a sum of not lessthan £150,000; and what action he proposed to take.—Dr. ADDISON replied: I appreciate very fully the importance of preserving these buildings for the treatment of the civilian population, and I am in communication with the London County Council on the subject.

THURSDAY, JULY 15TH.

Health Services Vote.

THE House went into Committee (Sir F. BANBURY in the chair) on a vote of £17,572,797 for the salaries and expenses of the Ministry of Health, including grants and other expenses in connexion with housing, grants to local authorities, &c., sundry contributions and grants in respect of benefits and expenses of administration under the National Insurance (Health) Acts, 1911 to 1919, certain grants in aid, and certain special services arising out of the war.

Dr. ADDISON, Minister of Health, said that this was the first time that the estimates of the Ministry had been presented to the Committee. He referred to the serious loss which the Ministry had suffered in the first year of its work through the death of Sir Robert Morant, who was at all times a loyal and trusted friend, a great servant of the public, and an example to all of self-denying, far-sighted, resolute patriotism. During the year various services had been amalgamated, including those relating to the Health Insurance Department, the Registrar-General, the work of the Board of Education in regard to school medical services and prospective mothers, the work of the Home Office under the Children Act, and a very important branch of the public service which lately came under its purview, the Board of Control dealing with the whole question of lunacy and other minor services. A number of other services foreign to their interests, particularly railways, roads, bridges, and locomotives, and libraries and museums, had been handed over to other Departments. A great part of the work of the Department had been absorbed during the year in consideration of various aspects of the proposals which would in due time be submitted to Parliament with regard to health services outside the Ministry. It was clear that a sound health policy would require time and patience for its development, and any rash expenditure might be misleading and wasteful. The first essential in any well-defined health policy was the spread of good common information, for the foundation of many of their possibilities was in the home. Any sound system must be based upon the principle of prevention. Hitherto they had not made so much progress in that direction as they might have done. Any proper development of a preventive health service must depend upon an adequate supply of trained persons, and in this respect there was at present in many branches a serious deficiency, which it would take time to remove. Any systematic preventive scheme must offer fairly full facilities for dealing with early disability and have at its service an active prosecution of scientific research. The preventive services developed in this country up to the present, so far as they related to the surroundings of individuals, reached a stage of development beyond that of any other. Our sanitary services were well developed, and it was largely owing to them that the health of the people, many of whom dwelt in most pestilential places, was as good as it was. Speaking of the question of housing, the right honourable gentlemen said that they were now past the final stage in over 200,000 houses, but the tenders had been approved and finally settled in regard to 126,000 houses, the only difficulties being finance and labour. Of the 126,000 houses the contract had been signed and work had been started on the site in respect of 69,887. In addition to this, work had been begun on 70,000 houses, and there were an additional 12,000 where the work had been begun with a subsidy. Over 2000 houses were inhabited and another 5000 or 6000 would be completed in the next month or two. As regards cost, the tender quotation for the same class of house had risen in respect of each house £100 during the last six months. Such a disastrous increase could not go on, and the only way it could be compensated was by a check in the rise in the cost of materials, by getting greater output from labour, and by a national understanding with regard to wages.

Security Against Invasion of Disease.

He was glad to say the sanitary cordon which the Ministry had organised round this country had been remarkably successful in securing it against invasion by disease from other parts of Europe which had threatened at the time of demobilisation. They had arranged with the Treasury, in order to help the Port Sanitary Authorities, to pay 50 per cent. grants towards their expenses. They had had another danger before them last year—namely, the fear that rested on the minds of people that there would be another influenza epidemic such as had such devastating results the year before. In the first quarter of 1919 37,000 people, mostly adults in the prime of life, died of influenza. They did all they could by arrangements with the Foreign Office to be supplied with information from abroad. They organised a number of experts in other departments, and they prepared documents giving such information as they could to encourage the people to protect themselves against the disease. They also provided a great number of doses of a protective vaccine which was used freely, and though, no doubt, he gave offence to those who were not in sympathy with such methods, he thought they were justified in spending money in that way. Similarly they took steps under Sir David Semple to deal with rabies cases. In no disease was it easier to spend money unwisely than in combating tubercle. They had encouraged the development of accommodation in sanatoriums, and had added more than 2000 beds in the last year. In connexion with the sanatoriums, they had provided 1000 places for training the men and there was a grant for each. Unless the system could be one that began at home and ended in re-creating, as far as possible, a useful unit in the community under healthy conditions, it must in many respects be largely wasteful. They had now a dispensary system developed to a certain extent, but no dispensary system would be successful in preventing tubercle and no sanatoriums would wipe out the disease while people had to live crowded in unhealthy dwellings. Inappropriate or insufficient food and bad conditions of life and work were all a part of the tuberculosis problem. There had grown up in some places the village colony conception of what was necessary, and they had one or two standing illustrations, notably in Cambridgeshire, of the very successful application of that principle. Research combined with supervision by one directing authority were needed if they were to have a properly coördinated preventive system. Speaking of venereal disease, Dr. Addison said there was no branch of service in which it was more necessary to have a trained personnel. There had been a substantial increase in the number of persons attending the centres. The total had gone up from 460,000 to 843,000, and the scheme was, so far, only in the beginning. There was a tendency amongst certain protagonists to fall upon one another in regard to the method of dealing with the disease. He exhorted them to fall upon the disease. The war had shown that properly directed efforts could cut short a great number of cases that otherwise would develop into mental deficiency of a permanent kind, and it was necessary clearly to provide that in any future arrangements the authorities should be able to deal with mental cases while they were at an early stage to avoid their being labelled lunatics.

Early Treatment of Mental Disorders.

If a system could be developed for the early treatment of mental disorders many asylums would be unnecessary. To develop the work towards this end post-graduate courses for medical men had been arranged under various authorities, and courses of training for nurses and others for this class of disease were being pushed forward. In no matter was it more important to have trained personnel than in questions affecting the charge of mothers. Hence the importance of maternity and infant welfare homes. It had become clear to him that the thing necessary for success was to have trained personnel at their command in the way of nurses and midwives, &c. Therefore it was arranged last year with the Board of Education to have additional grants for training for health visitors, midwives, &c. That had been taken up very extensively. At present there were 700 midwives under training, and the number of centres where this supervisory work was carried on had increased from 1400 to 1600. The proportion of the population in the country which was now reached by these services increased during the past year from 55 to 61 per cent., a substantial increase on the rural population. Towards the end of the last century and the beginning of this the infant death-rate remained stationary at about 150. It was 154 in 1900 and 154 in 1901. It did not begin to fall until 1906, when it was 132. In 1918 it dropped to 97, and last year it dropped to 89, in spite of the fact that in the last quarter of last year there was the influenza epidemic. The figure for the last three quarters of last year and the first quarter of this year was only 78, or about half what it was 20 years ago. Those children who survived nowadays were better nourished and more likely to be useful members of the community hereafter. He had taken out in full the child death-rate for the five year periods up to 1915—he had not got them for the past five years—and the fall had been from 57 to 37, and it was still falling in the same way. Then he looked to see the result of the medical examination of school children notwithstanding this improvement, which, of course, had not made itself felt sufficiently as yet in the children who went to school. But he had found that, although they were developing medical service as energetically as they could, of the

first 750,000 children examined in the schools last year 40 per cent. were still found to be physically defective. The facilities for treatment had improved, and 69 per cent. of these had received treatment.

Position of the Voluntary Hospitals.

One of the subjects which must be the source of great anxiety was the position of the voluntary hospitals. They had under the Poor-law hospitals numbering more than half the hospitals of the country, and he had arranged to have these surveyed from a medical point of view, because it was necessary that not only should they be fully aware on the financial side of what they were doing, but they required a medical scientific survey of the hospital services which were available now and might be made more available under the Poor-law at the present time. Besides the assistance which had been given to the voluntary hospitals by the King Edward's Fund other proposals were being worked out. Those who, representing the voluntary hospitals, came to the Ministry and discussed the matters with them had, he thought, at first in mind that the Ministry was greedy to take hold of those institutions for some purpose or other of its own. They had enough responsibility in the administration of their services to save them from any temptation of that sort. Many of these institutions were pioneers of efficient service, and it would be a mistake of the first order to seek to interfere with that efficiency. Any scheme which the Ministry put forward would be designed to promote their public utility. In one other matter the Ministry had taken a step which would be recognised as essential—namely, in doing what it could to secure further provision for scientific and medical research, and the Treasury had made a grant for the service of £125,000, compared with less than £60,000 a few years ago. The paltry sum of £70,000, or thereabouts, by which they had increased the expenditure on medical research was a trifle as compared with the results which had already been achieved, and compared with expenditure in other directions which was far from being so fruitful. He had before him a long list, but he would only take two or three instances of the useful work which was being done by the grants given under this head. A grant was made with regard to the prevention of T.N.T. poison, for which they were paying several thousands pounds a week compensation. They only gave a few hundreds out of this research fund for the purpose, but it practically abolished T.N.T. poison. One of the age-long plagues of Egypt would have caused them immense expenditure just now had it not been for the work of research assisted out of this fund. Various grants under different headings were made at different times out of this research fund in connexion with antityphoid work. In the South African War the total strength of the British Army was about 530,000. The average ration strength was 208,000. In that war there were 57,684 cases of typhoid, and 8022 died. In the recent war the total strength of the forces would be under-estimated at 5,000,000, and the ration strength would be under-estimated at 1,200,000. Mainly as a result of research there were only throughout the whole war in the British forces 7423 cases of typhoid and 266 deaths.

More Money Needed for Medical Research.

Lieutenant-Colonel RAW congratulated the right honourable gentleman on the satisfactory and encouraging statement which he had made. There was no question that the general health of the community had undergone an extraordinary improvement during the last 25 years. He was very glad that the right honourable gentleman was asking for more money for medical research, because they felt, having very carefully to consider trying to do their best to eradicate such important diseases as influenza, scarlet fever, measles, and diphtheria, that they did not know sufficient about the causation of these diseases which produced such an enormous death-rate every year. They were all very proud of the voluntary hospitals. They had been the pride of this country and the envy of other countries, but we had now come to a time when these hospitals were unable, through insufficient financial support, to carry on the magnificent work which they had done for the last 300 or 400 years. There was a great class who were entirely overlooked in hospital accommodation, but they did not propose to accept charity, and they resented very much having to apply to the Poor-law. He hoped that the Minister of Health, in framing a broad and wise policy for the treatment of diseases in hospitals—because a great many of them could be treated only in hospitals—would, by combining and retaining the great voluntary hospitals, and in some way associating the great Poor-law infirmaries, many of which were quite empty and not required by Poor-law patients, be enabled to provide a national scheme of hospitals, which would be acceptable and beneficial to the whole nation. He was glad to hear the right honourable gentleman say that they would, at all costs, encourage the voluntary hospitals, and in no way interfere with their efficiency, but he was quite certain that financial support would have to be given to voluntary hospitals by the State if they were to continue the excellent work which they had done for so long. He hoped that the Bradford experiment would be copied, so that hospitals might be provided on a national basis in which the patients would be able to pay for what they received.

In regard to the treatment of mental disorders, what was most required was that there should be facilities for the treatment of those persons afflicted with temporary mental disorder without their being certified as insane. If such a course were pursued, a very large number of people would be saved from drifting into hopeless insanity, and a very large amount of the accommodation in the asylums would not be needed. In this matter he hoped that there would be no association whatever with any lunacy authority, and that treatment would be obtainable in some hospitals totally unconnected with a lunatic asylum. The speech of the right honourable gentleman, with its outline of far-reaching schemes, had fully justified the formation of the Ministry.

Lieutenant-Colonel FREMANTLE joined in the congratulations to the Minister for the statement as to the way in which his Department in the first year after its creation had tackled the problems it had to face.

Progress was reported.

Statistics of Drunkenness in England and Wales.

Mr. HAYDAY asked the Secretary for the Home Department whether he could state what proportion the convictions for drunkenness bore to the population of Carlisle for each of the years 1914 to 1919; and what was the average proportion for all the county boroughs of England and Wales for the same years.—Sir JOHN BAIRD (Under Secretary for Home Affairs) replied: The figures desired are to be found in the Annual Volumes of Licensing Statistics and particularly in column 5 of Comparative Table B in each volume. They are as follows (the figures for the year 1919 being taken from the proof of the volume for that year which is in the press and not yet published):—

Proportion of Convictions for Drunkenness per 10,000 of Estimated Population in Carlisle and all County Boroughs respectively in Each of the Years 1914–19.

Year.	Carlisle.	All county boroughs, including London County.
1914	52·07	73·26
1915	52·45	54·92
1916	180·45	33·33
1917	60·59	19·18
1918	15·15	12·35
1919	12·96	23·75

For the years 1914, 1915, 1916, 1917, and 1918 the proportion to population is based on the estimated population for the middle of the year 1914. For 1919 the proportion is based on the estimated population for the middle of 1918. The estimated population of Carlisle for the middle of 1914 was 52,813; for the middle of 1918 it was 60,188.

Financial Position of the Voluntary Hospitals.

Major GODFREY PALMER asked the Prime Minister whether his attention had been called to the financial condition of the hospitals of the country; whether he was aware that some hospitals, owing to diminution in voluntary subscriptions, were in danger either of having to close entirely or much restrict their work; and whether he would cause immediate steps to be taken to deal with the matter.—Dr. ADDISON (Minister of Health) replied: I have for some time past been giving the most anxious consideration to the future of the voluntary hospitals. The situation in London has been relieved by the recent emergency distribution of £250,000 by the King Edward Fund, and the position of the provincial hospitals is generally less serious than in London. The question of State assistance raises many difficult issues, and I am anxious to avoid any precipitate measures which might prejudice the voluntary principle, to the maintenance of which I attach the greatest importance.

Protection of Young Persons Bill.

Mr. WIGNALL presented a Bill "to make further provision for the protection of persons under the age of 21 years from sexual immorality and from conduct akin thereto or connected therewith and to amend Sections 58 and 59 of the Children Act, 1908." The Bill was read a first time.

MONDAY, JULY 19TH.

Milk Imported from the Continent.

Captain Sir BEVILLE STANIER asked the Minister of Health if he could state what was being done to safeguard the consumers of the milk imported from Denmark and Holland; if the milk was being tested for purity and quality when it reached England; and were the farms inspected which produced the milk by their respective Governments.—Dr.

ADDISON replied: I understand that a few experimental consignments of sterilised milk were imported from Denmark in the earlier part of the year, but that the undertaking proved unremunerative. I have no information of milk imported from Holland, but in either case consignments would be subject to examination at the port of entry under the Unsound Food Regulations. Samples of the Danish milk have also been examined at the Ministry of Health. There is, I believe, a system of municipal inspection of dairy farms in Denmark and Holland.

Insurance of Agricultural Workers.

Captain REGINALD TERRELL asked the Minister of Health if he would state what had been the cost per cent. of the receipts from contributions of the working of the National Health Insurance scheme; what proportion in each case applied to workers engaged in agriculture; and the amount in the last year for which figures were available of claims paid to, and the contributions of, agricultural workers under the scheme.—Dr. ADDISON replied: With regard to the first part of the question, the question of working the National Health Insurance scheme by the general body of Approved Societies represents on the average about 12 per cent. With regard to the second and third parts of the question, the Department is not in possession of statistics as to the particulars asked for, whether in the case of agricultural workers or workers in other industries. The records required from the Approved Societies under National Health Insurance do not afford the desired information, because those bodies are not organised according to occupation.

Civilian Doctors and Income-tax.

Captain ELLIOT asked the Chancellor of the Exchequer if he would state why women doctors who were serving at home on whole-time contracts, but were told off to attend female units such as Queen Mary's Army Auxiliary Corps, had been refused the income-tax concession which was granted to other persons who were doing work of a military character; and if he would take the necessary steps to see that the matter shall be adjusted.—Mr. CHAMBERLAIN replied: Civilian doctors, whether men or women, detailed to attend units such as Queen Mary's Army Auxiliary Corps in this country cannot be regarded as entitled to the income-tax reliefs, which under Section 42 of the Income-tax Act, 1918, were allowed to sailors, soldiers, and others, who performed service of a naval or military character in connexion with the war.

Medical News.

UNIVERSITY OF OXFORD.—At examinations held recently the following candidates were successful:—

D.M.—F. L. Apperly, Lincoln (in absentiâ).
M.S.—N. A. Sprott, Christ Church.

UNIVERSITY OF MANCHESTER.—At examinations held recently the following candidates were successful:—

DEGREE OF B.SC. IN PUBLIC HEALTH.

E. N. Ramsbottom, M.B., Ch.B.

DIPLOMA IN PUBLIC HEALTH.

Part II.—William Ash, M.B., B.S.; Sybil Bailey, M.B., Ch.B.; J. C. Beckitt, M.R.C.S., L.R.C.P.; Hilda K. Brade-Birke, M.B., Ch.B.; J. P. Charnock, M.B., Ch.B.; W. J. McIvor, M.B., Ch.B.; C. G. Magee, L.R.C.P.; Kathleen O'Donnell, M.B., Ch.B.; W. J. A. Quine, M.B., B.S.; Arnold Renshaw, M.D.; and L. S. Robertson, M.B., Ch.B.

UNIVERSITY OF BRISTOL.—At the examination held recently for the degree of M.D. the following candidate was successful:—

Oliver Charles Minty Davis, D.Sc., M.B., Ch.B.

UNIVERSITY OF GLASGOW.—The following degrees were conferred on July 19th:—

DOCTOR OF MEDICINE (M.D.).

James Gordon Wilson, M.B., Ch.B. (with commendation); Albert Barnes Hughes, M.B., C.M.; Donald MacKenzie MacRae, M.B., C.M.; and John Young, M.B., Ch.B.

BACHELOR OF MEDICINE AND BACHELOR OF SURGERY (M.B., CH.B.).

With Honours.—Jonn Wyllie and James Lorimer Halliday.
With Commendation.—William John Ferguson, Robert Dick Gillespie, John Lang Anderson, Helen Frances Wingate, Archibald Gordon Smith, Elsie Florence Farquharson, Margaret Longwill Johnston, William John Payne, and Gilbert Paterson.
Ordinary Degrees.—Marion Bell Armstrong, James Baird, Annie Barlow, Lillias Elizabeth Barr Buchanan, Alister Campbell, James Gibson Campbell, Edith Chalmers, James Livingstone Cowan, Edith Margaret Davidson, Simonne Denil (Mrs. Thompson), Christian Melville Fleming, John Frew, Robert MacInnes Gardner, James Alexander Moore Hall, Jack Hurwich, Elizabeth Smith Inglis, Isabel Edgar Russell Jeffrey, Anna Taylor Kellock, William Malcolm Knox, John Lavelle, Jane Carrick MacDonald, Robert MacKintosh M'Kean, Alexandrena Miller Maclennan, Peter M'Luskie, Joseph Patrick M'Millan, Peter Macmurray, Charles Melville, Janet Dick Montgomery, James Orr, James Paterson, Tejendra Nath Ray, Wilfrid Henry Scott, James Smart, David Croydon Smith, Mary Steven, Margaret Mavor Stuart, Helen Bruce Sutherland, James Nisbet Tennent, Jonathan Robson Turner, Mary Carswell Walker, Daniel May Watson, Mary Lyle Wilson, and Agnes Hart More Young.

QUEEN'S UNIVERSITY OF BELFAST.—Graduation day was on July 16th, when the following degrees in Medicine were conferred:—

M.D.—Edwin G. B. Calvert (gold medal), Edward B. C. Mayrs (gold medal), Robert Marshall (with distinction), Francis C. Carson, Robert M. Fraser, David Jamison, William S. Lloyd, Alexander M'D. M'Mullan, Abraham Porter, R. Lindsay Rea, and Edith Robinson.
M.Ch.—Henry P. Hall (gold medal), Henry P. Malcolm, George R. B. Purce, and R. Lindsay Rea.
M.B., B.Ch., B.A.O.—With Honours: Second Class: Frederick M. B. Allen, Victor M. Allison, Francis J. Boyd, Cawthorne L. Broomhead, R. Leslie Dodds, James S. J. Lee, James P. Martin, and Thomas G. W. Sloan.
Pass: John Alexander, Marion C. Alexander, Joseph F. Blaine, Crawford Blair, James S. Briggs, William Caithness, Robert J. E. Christie, Henry E. Coulter, Charles D. Crawford, William E. D. Crawford, Alexander Cromie, William F. Donaghy, John S. Dudgeon, John H. Dunn, Isaac Eban, Abraham H. Elliott, Patrick J. Flood, Thomas Gilfillan, Winifred E. Hadden, George Haddick, Patrick J. Honan, Thomas J. Hull, Lydia N. Humphries, Richard H. Hunter, Thomas R. V. Irwin, James W. Kernohan, Sydney W. T. Lee, Daniel V. M'Caughan, Phillip J. M'Garry, Henry M'Neill, Eveline F. Magee, Joseph Meban, Horatio N. Middleton, Elizabeth Michael, Phillip F. Mooney, Edward Moore, Helen M. Murnane, Joseph P. O'Kane, James J. M'C. O'Reilly, Joseph Reynolds, Samuel J. Stewart, George B. T. Story, William Verner, and James B. Wiley.
Diploma in Public Health.—Samuel Acheson, George Chesney, William Graham, James A. Harbison, George D. M'Iver, Thomas B. M'Kee, Herbert M'Master, James C. M'Millan, Robert C. M'Millan, Vincent Magee, George W. Rea, and Alexander M'M. W. Sergerdal.

There are now over 1100 students at the University, by far the largest faculty being the medical. The executive committee of the Better Equipment Fund has decided to sell the ground at New Forge, Belfast, and to give the proceeds of the sale to the University for acquiring a more suitable athletic field. The Cherryvale estate in the Newtownbreda district (where there is also an excellent dwelling-house which can be made a pavilion) has been bought for the sum of £20,000, and with alterations it can be made a good playing ground for football and cricket. The Senate at their last meeting (July 14th) appointed a committee to consider the question of the matriculations for entrance into the various faculties, the number of students in attendance at the faculties, and the number of those proceeding to an honours course. The committee was empowered to receive evidence from, or confer with, any body or any individual, either inside or outside the University, and to report to the Senate the result of the investigations.

Dr. Harvey Bateman, of Blackheath, has received from the King of the Belgians the Médaille du Roi Albert "avec rayure" in recognition of valued services rendered to the Belgian cause during the war.

Dr. F. W. Edridge-Green has been appointed a special examiner in colour-vision and eyesight by the Board of Trade.

Mr. Henry Kimpton announces the publication of the eighth edition of Dr. Hobart Amory Hare's "Diagnosis of Disease."

MIDDLESEX HOSPITAL NURSES' HOME.—The new home for nurses of the Middlesex Hospital, opened at Nos. 74, 76, 78, and 80, Gower-street, by Princess Alice on July 8th, is one of the best of its kind in London. Of the £13,000 required the sum of £8000 has been already collected, leaving £5000 to be raised to complete the equipment of this and of the other two homes for Middlesex nurses.

NATIONAL HOSPITAL, QUEEN-SQUARE.—Although several wards of the hospital have been closed through lack of funds, the whole of the out-patient department is working as usual.

GLASGOW ROYAL INFIRMARY: POST-GRADUATE CLASSES.—During the month of September a very complete course of post-graduate teaching will be conducted by the staff of this institution. Full details as to classes and emoluments are given in the advertisement columns.

1ST SCOTTISH GENERAL (TERRITORIAL) HOSPITAL: COMPENSATION FOR DAMAGE.—For damage done to Oldmill Poorhouse (late 1st Scottish General Hospital), caused by military occupation during the war, the Aberdeen Parish Council entered a claim against the War Office for £15,972. Lieutenant-Colonel Martin Cowan, valuator for the War Office, has assessed the damage at £12,606, and the Poorhouse Committee has recommended the Council to accept this sum. There is an additional £554 which has been transferred to another account, of which the Committee hope to receive payment.

Dr. C. Muthu, chief physician of the Mendip Hills Sanatorium, was entertained by old patients at dinner on July 16th in recognition of his completion of 21 years of sanatorium work. A presentation was made of an antique silver inkstand.

PAYING PATIENTS AT THE ROYAL PORTSMOUTH HOSPITAL.—At a meeting held on July 16th the committee decided to require payment, after August 1st, of 15*s.* per week for each adult in-patient and 7*s.* per week for those under 14 years of age, to cover the cost of maintenance. For those who are not in a position to pay these sums the committee will exercise its discretion and reduce the charge or waive it altogether. There is now an overdraft at the bank of £8500, which means a drain of about £10 per week on the income.

EDINBURGH UNIVERSITY EXTENSION.—**On July 6th** the foundation-stone of the most recent extension of Edinburgh University was laid by the King. The buildings, situated on the south side of the city near Blackford Hill, are to be known as the "King's Buildings," and that portion at present in course of erection is to be used for the accommodation of the chemistry department. The King and Queen, with Princess Mary, were received by the principal, Sir Alfred Ewing. After signing the University Album the King inspected the plans of the building and declared the foundation-stone to be well and truly laid. The Queen was then presented for the degree of Doctor of Laws.

SUMMER SCHOOL OF EUGENICS AND CIVICS.—The Eugenics Education Society is organising a summer school, dealing with the co-relation of eugenics and citizenship, at Herne Bay College, from Saturday, July 31st, to Saturday, August 14th. The inaugural address will be given by Professor Arthur Dendy, F.R.S., entitled "Evolution in Human Progress." Other evening public lectures include "The Press and Right Citizenship" and "The Treatment of Crime from a National Standpoint." The curriculum is arranged to deal with the problems of heredity, biology, and social psychology as they affect the lives of citizens in the present century. Among the lecturers are Dr. W. A. Potts (medical officer to the Birmingham Committee for the Care of the Mentally Defective), Mr. E. B. Turner, Dr. Otto May, and Dr. C. W. Ponder. The secretary of the school, Miss Constance Brown, may be addressed until July 30th at 11, Lincoln's Inn Fields, London, W.C. 2, after that at Herne Bay College, Kent.

SCHEME FOR A CENTRAL HOSPITAL IN ABERDEEN.—The scheme for centralisation on one site of the Aberdeen hospitals was advanced a stage further at a conference of the various public bodies interested in the proposal, which was held at the Town Hall on July 15th under the presidency of Lord Provost Meff. General approval was given to the scheme outlined by the Medico-Chirurgical Society, and it was resolved to appoint an executive committee for the purpose of inquiring into details and preparing an approved scheme for consideration at a subsequent conference. The executive committee consists of four representatives of each of the five bodies—the Medico-Chirurgical Society, the Royal Hospital for Sick Children, the Royal Infirmary, the University of Aberdeen, and the Town Council, along with Professor Matthew Hay, with powers to co-opt additional members. At a previous conference held on April 20th it was explained that the Medico-Chirurgical Society were of opinion that the requirements of the different hospitals could best be supplied by the provision of a common site, and that this would require to be sufficient for the needs of these institutions for the next 50 years. In the case of the Infirmary 500 to 600 beds would be required, and for the Sick Children's Hospital 150 to 200 beds. The departments of the University most closely associated with clinical work, such as those of medicine, surgery, bacteriology, and bio-chemistry, possibly the Incurable Hospital and the Ophthalmic Institution, would also be accommodated and provision made for the treatment of early mental cases and military patients. A dental school and a hostel for senior students might also be included. The advantages claimed for such a scheme are economy in management, more efficient service, combined training for nurses, up-to-date equipment, closer relations between the institutions concerned and the University, and possible post-graduate teaching.

THE DEATH OF SIR ALEXANDER DEMPSEY, M.D., J.P.—The death of a well-known and justly popular member of the medical profession, Sir Alexander Dempsey, occurred on July 18th. A county Antrim man, he was born in 1852, at Coldagh, Ballymoney, a son of the late Mr. Bernard Dempsey and a member of an able family. As a boy he was educated at St. Malachy's College, Belfast, and as a student he went to Queen's College, Galway, and to the Roman Catholic University Medical School, Dublin, graduating M.D. of the Royal University of Ireland in 1874 and L.R.C.S.I. in the same year. He subsequently became a Fellow of the Royal College of Surgeons in Ireland. Immediately after graduating he started practice in Belfast, and made rapid headway in his profession, until at the time of his decease he was the principal Catholic doctor in Belfast and the north of Ireland. He took a great part in establishing the British Medical Association in Ulster, of which he was one of the first secretaries. He was an ex-President of the North of Ireland branch of the British Medical Association and of the Ulster Medical Society. In the erection and extension of the Mater Infirmorum Hospital he took the deepest interest, and at the time of his death he was consulting physician and acting gynæcologist to that institution. He was a member of the governing body of University College, Dublin, and an extern examiner in midwifery and gynæcology in the National University, of the Senate of which he was for a time a member. For the past two years he had been a member of the Senate of Queen's University, Belfast, and on several occasions he had held the office of university clinical lecturer in the Belfast School of Medicine. He was a Fellow of the Royal Society of Medicine and of the Royal Academy of Medicine in Ireland. In 1880 he was appointed a justice of the peace for Belfast, and in 1911 he was knighted. A man of great native shrewdness and of a most genial temperament, Sir Alexander Dempsey was a very hard worker and a most excellent medical opinion. He is survived by two sons, one a doctor, the other a member of the Irish Bar, and four daughters. His wife predeceased him. After a Requiem Mass at Holy Family Church, Newington-avenue, Belfast, on July 20th, he was interred in Milltown Cemetery, an immense number of friends and medical confrères being present.

LISTER MEMORIAL FUND.—**At a public meeting** held at the Mansion House in October, 1912, the following proposals for commemorating the work of Lord Lister were adopted:—

The placing of a memorial in Westminster Abbey, to take the form of a tablet with medallion and inscription.

The erection of a monument in a public place in London.

The establishment of an International Lister Memorial Fund for the advancement of surgery, from which either grants in aid of researches bearing on surgery or awards in recognition of distinguished contributions to surgical science should be made irrespective of nationality.

A meeting of the General Committee was held in the rooms of the Royal Society on July 19th last to receive and adopt the report of the Executive Committee appointed in 1912. The chairman, Sir Archibald Geikie, stated that the sums received in respect of subscriptions from the British Empire and foreign countries amounted to £11,846 5*s.* 10*d.* Expenses incurred in printing, stationery, postage, advertising, &c., amounted to £390. The report stated that delay had necessarily occurred in carrying out all the proposals adopted at the Mansion House meeting, but that a memorial tablet, executed by Sir Thomas Brock, had been unveiled in Westminster Abbey on Nov. 1st, 1915, and steps were being taken for the erection of a monument in a public place in London.

In order to carry out the scheme for the establishment of the International Lister Memorial Fund for the Advancement of Surgery the following proposals were adopted:—

(*a*) That out of the General Fund a sum of £500, together with a bronze medal, be awarded every three years, irrespective of nationality, in recognition of distinguished contributions to surgical science, the recipient being required to give an address in London under the auspices of the Royal College of Surgeons of England.

(*b*) That the award be made by a Committee constituted as follows: Two members nominated by the Royal Society, two members nominated by the Royal College of Surgeons of England, one member nominated by the Royal College of Surgeons in Ireland, one member nominated by the University of Edinburgh, one member nominated by the University of Glasgow.

(*c*) That any surplus income of the General Fund, after providing for the erection of a monument, and after defraying administrative expenses, be either devoted to the furtherance of surgical science by means of grants, or be invested to increase the capital of the Fund.

The continued carrying out of this scheme in future years will require the provision of some permanent and adequate machinery as the Lister Memorial Committee cannot, in view of its constitution, be itself permanent. The Committee, having ascertained that the Royal College of Surgeons of England would be prepared to become the trustees and administrators of the Lister Fund and to carry out its objects, subject to the above provisions of the scheme, authorised the Executive Committee to take such steps as may be necessary to give effect to this arrangement.

The subscription list is still open, and the honorary treasurer of the Fund is Sir W. Watson Cheyne, Bart., ot whom donations may be addressed at the Royal Society, Burlington House, London, W. 1.

METROPOLITAN HOSPITAL SUNDAY FUND.—The total of the Hospital Sunday collection up to July 16th was £84,000.

GIFTS TO UNIVERSITIES.—Sir Jesse Boot has given £50,000 to the new Nottingham University scheme, £20,000 being for a chair of chemistry. Alderman Louis Samuel Cohen has given £15,000 to Liverpool University.

THE King of the Belgians has conferred upon Dr. Francis J. Allan, medical officer of health for Westminster, the Médaille du Roi Albert, in recognition of valued services rendered to the Belgian cause during the war.

THE medal of the Most Excellent Order of the British Empire has been conferred upon Dr. J. F. Williams, who is in practice at Camberwell-road, London, "for courage and devotion to duty on the occasion of an air raid in rescuing persons who had been buried in the cellar of a burning building."

A WAR MEMENTO FROM BRITISH TO AMERICAN SURGEONS.—At the suggestion of Sir Berkeley Moynihan, who has worked in collaboration with Sir Anthony Bowlby and Sir D'Arcy Power, a silver-gilt mace is to be presented to the American College of Surgeons (which includes Canada) as a memento of the work done in coöperation by American and British surgeons during the war. The mace is the work of Mr. Omar Ramsden, a well-known art metal worker, who has modelled the head of the mace on the lines of a surgeon's mortar dug up in a Salonika trench. The design includes maple leaves and American eagles, the badges of the British and American Army Medical Corps, and the serpents of Æsculapius, while the name is introduced of Philip Syng Physick (1768–1837), the father of American surgery, who was a pupil of John Hunter and an ex-house surgeon at St. George's Hospital. An inscription reads: "From the consulting surgeons of the British Armies to the American College of Surgeons in memory of mutual work and good fellowship in the Great War." The mace will be on view for a month at the Exhibition of Industrial Art, 217, Knightsbridge, S.W.

THE PHYSICS AND CHEMISTRY OF COLLOIDS.—The Faraday Society and the Physical Society of London are arranging to have a joint symposium and general discussion on this important subject next October. The subject will be introduced by a brief survey of the present position of colloidal physics and chemistry, and discussion will then arise on the following subdivisions of the subject: Emulsions and Emulsification; Physical Properties of Elastic Gels; Cataphoresis and Electro-endosmose; Precipitation in Disperse Systems; Glass and Pyrosols; Non-aqueous Systems. It is remarked that in spite of the importance of colloidal physics and chemistry in many branches of manufacture, and of the interest which the subject has aroused in recent years, much light remains to be thrown on the nature of the manufacturing processes in which colloids play a part. It is hoped that the discussion will focus attention on some of these problems, and that its result will be to indicate lines of advance and suggest further researches, and that it will be fruitful not only in helping to a fuller understanding of the laws of the colloidal state, but also in suggesting new applications for colloids in the laboratory and in the works. The exact date and place of meeting and further particulars will be announced later. In the meantime anyone desirous of using the opportunity of the discussion to bring forward experimental matter or theoretical considerations bearing on the above-mentioned branches of the subject is asked to communicate, as soon as possible, with the secretary of the Joint Committee, 10, Essex-street, London, W.C. 2.

Communications, Letters, &c., to the Editor have been received from—

A.—Dr. E. D. Adrian, Cambridge.
B.—British Olympic Association; The Successors of F. Bohn, Haarlem; Mrs. C. Brereton, Lond.; Sir John Rose Bradford, Lond.
C.—Chadwick Trust, Sec. of; Dr. I. G. Cobb, Lond.; Dr. C. Chidell, Folkestone; Canadian Pacific Ocean Services, Lond.; Dr. F. G. Crookshank, Lond.; Dr. H. P. Cholmeley, Forest Row; Dr. N. Crichlow, Tulagi, British Solomon Islands.
D.—Dr. L. S. Dudgeon, Lond.; Dr. H. Drinkwater, Wrexham; Sir F. Danson, Lond.; Dr. F. W. F. Day, Ipoh; Prof. H. B. Day, Sandwich; Prof. S. Delépine, Manchester.
E.—Dr. J. W. Edington, Hythe; Edinburgh Anti-Opium Committee; Dr. F. W. Edridge-Green, Lond.
F.—Dr. Z. P. Fernandez, Leeds; Dr. G. L. K. Finlay, Lond.
G.—Dr. N. Gray, Newmarket; Dr. K. Gengnagel, Frankfort-on-Main.
H.—Home Office, Lond.; Major W. E. Home, R.A.M.C.; R. H. Heward Co., Lond.; Mrs. M. Hogarth, Lond.; Prof. W. Hall, Bristol.
I.—Insurance Committee for the County of London; Dr. H. Ingleby, Lond.
J.—Mr. W. B. Jepson, Lond.; Dr. G. G. Johnstone, Lond.; Dr. L. Jones, Merthyr Tydfil; Dr. C. O. Jones, New Brighton.
K.—Prof. A. F. S. Kent, Manchester; Dr. R. Knox, Lond.
L.—Dr. A. Loxton, Birmingham; Mr. H. K. Lewis, Lond.; Dr. H. Long, Lond.; Dr. C. E. Lakin, Lond.; Lt.-Col. P. S. Lelean, Lond., Dr. C. Lillingston, Gorleston-on-Sea; Dr. G. C. Low, Lond.; London County Council, Clerk of.
M.—Dr. Kathleen McKeown; Metropolitan Hospital Sunday Fund, Lond.; Dr. H. C. Miller, Lond.; Dr. R. W. McKenna, Liverpool; Mrs. M. McConnel; Dr. J. E. R. McDonagh, Lond.
N.—National Hospital for the Paralysed and Epileptic, Lond., Sec. of.
O.—Dr. R. A. O'Brien, Lond.; Dr. T. Orr, Lond.
P.—Sir D'Arcy Power, Lond.; Physical Society of London; Dr. J. Pirie, Leamington; Mr. T. H. Pear, Manchester; Dr. T. Paul, Janipur; Col. A. G. Phear, Lond.
R.—Dr. J. D. Rolleston, Lond.; Dr. J. E. H. Roberts, Lond.; Rockefeller Institute for Medical Research, New York; Royal College of Physicians, Edinburgh.
S.—Sir E. A. Schafer, Edinburgh; Prof. W. Stirling, Manchester; Dr. J. H. Sequeira, Lond.; Dr. T. H. G. Shore, Padstow; Dr. L. E. Shore, Cambridge; Dr. F. J. Scrimgeour, Nazareth.
T.—Dr. A. T. Taylor, Liberton; Mr. A. R. Thompson, Lond.; Dr. J. Tatham, Oxted; Sir StClair Thomson, Lond.; Dr. E. T. Thompson, Lond.
U.—University of Manchester; University of Glasgow.
W.—Dr. H. H. Woodcock, Walton-on-Thames; West London Hospital Post-Graduate College, Sec. of; Dr. K. M. Walker, Lond.

Communications relating to the editorial business should be addressed exclusively to the Editor of THE LANCET, 423, Strand, London, W.C. 2.

Medical Diary.

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

LONDON HOSPITAL MEDICAL COLLEGE.
MEDICAL UNIT, in the Clinical Theatre of the London Hospital, E.
A Course of Twelve Lectures on Neurology, open to Students and Graduates of the London Hospital and other Schools—
TUESDAY, July 27th.—2 P.M., Lecture V.:—Dr. Riddoch: Disorder of Sensibility from Lesions of the Spinal Cord and Peripheral Nerves.
WEDNESDAY.—2 P.M., Lecture VI.:—Dr. Thompson: Sensory Disturbances of Spinal Origin.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith, W.
MONDAY, July 26th.—2 P.M., Mr. D. Armour: Operations. 2.30 P.M., Dr. A. Saunders: Visit to Medical Wards.
TUESDAY.—2.30 P.M., Mr. T. Gray: Operations. 2.30 P.M., Mr. Addison: Visit to Surgical Wards.
WEDNESDAY.—2. P.M., Mr. Addison: Operations. 2 P.M., Mr. D. Armour: Visit to Surgical Wards.
THURSDAY.—2 P.M., Mr. D. Armour: Operations. 2.30 P.M., Dr. A. Saunders: Visit to Medical Wards.
FRIDAY.—10 A.M., Dr. Robinson: Gynæcological Operations. 2.30 P.M., Mr. T. Gray: Operations.
Daily:—10 A.M., Ward Visits. 2 P.M., In-patient Clinics and Operations.

NORTH-EAST LONDON POST-GRADUATE COLLEGE, Prince of Wales's General Hospital, Tottenham, N.
MONDAY, July 26th—10.30 A.M., Mr. H. Evans: Diseases of the Urethra. 11.45 A.M., Dr. Banister: Malignant Disease of the Uterus. 2 P.M., Dr. Sundell: Chronic Pleurisy in Children. 4.30 P.M., Lecture:—Dr. Banister: Medico-legal Bearings of Gynæcological Practice.
TUESDAY.—10.30 A.M., Mr. Benians: Urine Analysis. 11.45 A.M., Mr. N. Fleming: Ophthalmoscopic Examination. 2 P.M., Mr. Hayton: Diseases of Accessory Sinuses of Nose. 4.30 P.M. Lecture:—Lt.-Col. R. H. Elliot: Affections of Eye due to Tropical Disease as seen in this Country since the War.
WEDNESDAY.—10.30 A.M., Dr. Alexander: Examination of Gastric Contents. 11.45 A.M., Mr. Carson: After-Treatment of Abdominal Operations (with complications). 2 P.M., Dr. M. Bahr: Cases of Tropical Disease as Occurring at Home. 4.30 P.M., Lecture:—Mr. J. W. T. Walker: A New Method of Prostatectomy and the Reasons for its Adoption.
THURSDAY.—10.30 A.M., Mr. Hayton: Otological Examination. 11.45 A.M., Mr. Gillespie: Surgical Pathology of Appendicitis and its Bearing on Treatment. 2 P.M., Dr. Metcalfe: Treatment by Ionic Medication. 4.30 P.M., Consultations (Surgical).
FRIDAY.—10.30 A.M., Mr. Benians: Puncture Fluids. 11.45 A.M., Mr. Gillespie: The Application of Plaster-of-Paris in Joint Conditions. 2 P.M., Dr. Alexander: Differential Diagnosis of Dyspeptic Conditions. 4.30 P.M., Lecture:—Mr. Carson: Diagnosis of Tumours of Great Intestine.
SATURDAY.—11 A.M., Dr. F. Thomson (at the N.E. Fever Hospital, St. Ann's-road, N.): Cases Illustrating the Early Diagnosis of Infectious Fevers.
Each Day:—3-4 P.M., General Hospital Practice.

MALE LOCK HOSPITAL, Dean-street, W.
MONDAY, July 26th, WEDNESDAY, AND FRIDAY.—5 P.M., Dr. C. Russ: Demonstration of the Treatment of Gonorrhœa by Electrolysis.

CANCER HOSPITAL, Fulham-road, S.W.
Clinical Lectures on the Diagnosis and Treatment of Cancer.
TUESDAY, July 27th.—4.30 P.M., Mr. C. Rowntree: Cancer of the Breast.
FRIDAY.—4.30 P.M., Dr. H. Robinson: Anæsthetics in Cancer Cases.

MANCHESTER FRENCH HOSPITAL POST-GRADUATE LECTURES, 24, Acomb-street (behind Whitworth Park).
THURSDAY, July 29th.—4.30 P.M., Dr. A. C. Maglan: Chronic Uterine Complaints.

Appointments.

Successful applicants for vacancies, Secretaries of Public Institutions, and others possessing information suitable for this column, are invited to forward to THE LANCET *Office, directed to the Sub-Editor, not later than 9 o'clock on the Thursday morning of each week, such information for gratuitous publication.*

DEVONALD, A., Captain, R.A.M.C. (T.F.), has been appointed Regimental Medical Officer to 4th Batt., K.S.L.I. (T.), and Medical Referee for Bridgnorth and District under the Ministry of Pensions.

GILMOUR, A., M.D. Edin., Medical Officer of Health and School Medical Officer of Hindley, Lancashire.

LAWSON, Dr., Medical Officer of Schools under the Bradford Education Committee.

Certifying Surgeons under the Factory and Workshop Acts: ROGERS, C. D., M.B., Ch.B. Edin. (Ellesmere); JONES, W. M., L.R.C.P. & S. Irel. (Llanfaircaereinion); ROBERTS, E. S., L.R.C.P. Lond., M.R.C.S. (Penygroes); MCLEAN, J. A., M.B., Ch.B. Glasg. (Buckhaven); KEAN, J., L.R.C.P. & S. Edin., L.F.P.S.G. (Forkhill); FYFE, W. W., M.D. Glasg. (Johnstone); BAMFORD, T., L.R.C.P. Lond., M.R.C.S. (Uttoxeter); FLOOD, J. W., M.B., B.Ch. Dub. (Liverpool, Central).

Vacancies.

For further information refer to the advertisement columns.

Aberdeen University.—Lecturer in Bacteriology. £500. Also Asst. in Path.
Bath, Royal United Hospital.—H.P. £150.
Birkenhead Borough Hospital.—Jun. H.S. £200.
Birmingham General Hospital.—H.P., H.S., and Cas. H.S. £100.
Bolingbroke Hospital, Wandsworth Common, S.W.—H.S. £150.
Bolton Infirmary and Dispensary.—Female Sen. H.S. £300.
Bradford City Hospital, Leeds-road.—Asst. M.O. £350.
Bradford Royal Eye and Ear Hospital.—Aural S.
Bristol General Hospital.—P. and Asst. P.
Bristol Royal Infirmary.—Act. Hon. Asst. Obst. P. Also Res. Locum Tenens. 5 gs. a week.
Cardiff City Mental Hospital, Whitchurch, near Cardiff.—Sen. Asst. M.O. £550.
Cardiff, King Edward VII.'s Hospital.—H.S.'s. £200.
City of London Hospital for Diseases of the Chest, Victoria Park, E.—Res. M.O. £250. Also H.P. £100.
Colonial Service.—M.O.'s for West African Medical Staff, Government Service in Malaya, East African Protectorates, West Indies (including British Guiana), Fiji, and the Western Pacific, &c.
Croydon General Hospital.—Jun. H.S. £150.
Derby, Derbyshire Education Committee.—School M.O.'s. £550.
Dorchester, Dorset County Council.—Asst. County M.O. £500.
Dumfries and Galloway Royal Infirmary.—Res. H.S.
Gloucester, Gloucestershire Royal Infirmary and Eye Institution.—H.P. £175.
Halifax County Borough.—Female M.O. for Maternity and Child Welfare Clinics. £500.
Hereford County and City Mental Hospital.—Jun. Asst. M.O. £350.
Hove, Carr-Burton Memorial Hospital, Sackville-road.—Res. M.O. £250.
Huddersfield Royal Infirmary.—Sen. H.S. £250.
Huddersfield, Storthes Hall Asylum, Kirkburton.—Sen. Asst. M.O. £500.
Hull Royal Infirmary.—Asst. H.S. £150.
Johannesburg, South African Institute for Medical Research.—Asst. Bacteriologist. £800.
Leeds, City of.—Asst. M.O. for Maternity and Child Welfare. £500.
Leeds City Tuberculosis Sanatorium, Killingbeck.—Res. Asst. M.O. £300.
Leeds General Infirmary.—Res. Surg. O. £200.
Leith Hospital.—H.S. and H.P. £100.
Lonaon Temperance Hospital, Hampstead-road, N.W.—Asst. Res. M.O. £120.
Maidstone, Kent County Mental Hospital.—Jun. Asst. M.O. £300.
Manchester, Baguley Sanatorium for Tuberculosis.—Third Asst. Res. M.O. £300.
Manchester, City of.—M.O. £450 and war bonus of £307 15*s.* 6*d.*
Manchester, Monsall Fever Hospital.—Sec. Med. Asst. and Third Med. Asst. £300 each.
Manchester Royal Infirmary, Roby-street, Manchester.—Res. M.O. £200. Also H.P. £50 and £100.
Manchester Royal Infirmary.—Asst. Director, Clin. Lab. £300.
Miller General Hospital for South-East London, Greenwich, S.E.—Res. Cas. O. £150. Also H.S. £100.
Ministry of Pensions Hospital, Denmark-hill.—Visit. S. and Visit. P.
Newcastle-upon-Tyne, Hospital for Sick Children.—Jun. Res. M.O. £200.
Newcastle-upon-Tyne, Royal Victoria Infirmary.—Hon. Surg.
North St. Pancras School for Mothers, Queen's-crescent, N.W.—M.O. 1½ gs. per consultation.
Nottingham General Hospital.—Res. Cas. O. £300.
Plymouth Education Authority.—Dep. M.O.H. £600.
Plymouth, South Devon and East Cornwall Hospital.—H.P. £140.
Queen Charlotte's Lying-in Hospital, Marylebone-road, N.W.—Asst. Res. M.O. £60.
Queen's Hospital for Children, Hackney-road, Bethnal Green, E.—An æsth. £95. Also Path. £300.
Royal Institute of Public Health, Russell-square, W.C.—Sen. Demonstrator of Bacteriology.
Ryde, Royal Isle of Wight County Hospital.—Res. H.S. £250.
St. Bartholomew's Hospital.—S.
St. Mark's Hospital for Cancer, Fistula, and Other Diseases of the Rectum, City-road, E.C.—H.S.
St. Thomas's Hospital Medical School, Albert Embankment, S.E.—Demonstrator of Anat. £400.
Sheffield, Children's Hospital, Western Bank.—H.S. £200.
Sheffield, East End Branch of the Children's Hospital.—H.S. £150.
Sheffield Royal Hospital.—Asst. Cas. O. £150.
Sheffield Royal Infirmary.—H.P. £150.
Shoreditch Metropolitan Borough.—Asst. M.O.H. £600.
Southampton, Free Eye Hospital.—Locum Tenens.
South London Hospital for Women, South Side, Clapham Common, S.W.—Female H.S. £100.
Stafford, Staffordshire General Infirmary.—H.S. £250.
Staffordshire Education Committee.—Practitioners under M.O.H. and Sch. M.O. £600.
Swansea General and Eye Hospital.—Jun. H.S. £200.
Taunton and Somerset Hospital.—Sen. and Jun. H.S.'s. £200 and £150 respectively.
Warrington Infirmary and Dispensary.—Jun. H.S. £200.
Windsor, King Edward VII. Hospital.—H.S. £200.
Worcestershire County Council.—Asst. County M.O.'s and Sch. Oculist. £500 each.

The Chief Inspector of Factories, Home Office, S.W., gives notice of a vacancy for a Certifying Surgeon under the Factory and Workshop Acts at Yarmouth.

The Home Secretary gives notice that he proposes to appoint two additional Medical Referees under the Workmen's Compensation Act, 1906, for the Sheriffdom of Lanark. Applications for the posts, for which surgical qualifications are required, should be addressed to the Under Secretary for Scotland, Scottish Office, Whitehall, S.W. 1, and should reach him not later than August 7th, 1920.

Births, Marriages, and Deaths.

BIRTHS.

ATTENBOROUGH.—On July 19th, at The Ridges, Farnborough, Hants, the wife of Dr. Wilfrid Attenborough, of a son.

BROWN.—On July 16th, at Welbeck-street, W., the wife of William Brown, M.A., M.D., D.Sc., of a daughter.

CHANDLER.—On July 12th, to Marjorie (*née* Raimes), wife of F. G. Chandler, M.A., M.D. Cantab., M.R.C.P., of 86, Harley-street and 4, Downshire Hill, Hampstead—a daughter.

DUDGEON.—On July 10th, at Cairo, the wife of Captain C. R. Dudgeon, R.A.M.C., of a son.

SHERWOOD.—On July 13th, at Eastbourne, to the wife of Douglas Sherwood, M.B., a son.

TUCKER.—On July 11th, at Park View, Pembury, the wife of S. A. Tucker, M.B., B.S. (late Captain, R.A.M.C.), of a daughter.

VARIAN.—On July 16th, to George Varian, M.D., and Hilda Varian, M.D., Thornborough House, Clarendon-road, Watford, Hertfordshire—a son.

MARRIAGES.

DOWNES—YOUNG.—On July 15th, at Park Church, Helensburgh, A. Drummond Downes, M.D., Ch.B., to Mary Angela Young, daughter of the late James Young and Mrs. Young, Rockmont, Helensburgh.

PENNY—KENWORTHY.—On July 17th, at Hoghton-street Baptist Church, Southport, by the Rev. Charles Brown, D.D. of London, and the Rev. J. A. Smallbone, Dr. Cyril John, youngest son of T. S. Penny, Esq., J.P., of Knowle, Taunton, to Dr. Muriel Mercer, eldest daughter of Dr. and Mrs. Kenworthy, of Kenworthy's Hydropathic, Southport, and Bentley Lodge, Parbold.

ROBINSON—STREDWICK.—On July 15th, at St. Clement Danes, Strand, Harold Shillito Robinson, M.R.C.S., L.R.C.P. Lond., to Vera Emily, only daughter of Mr. and Mrs. C. E. Stredwick, of Denham House, Epsom.

DEATHS.

ADAM.—On July 11th, at Liverpool, Edward Morison Adam, M.R.C.S., L.R.C.P., aged 39.

RHYS GRIFFITHS.—On July 13th, suddenly, Philip Rhys Griffiths, M.B., B.Ch., of Newport-road, Cardiff.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

THE GIANT NURSERY IN PARIS.—Our Paris Correspondent writes that the proposal for the tranformation into a giant maternity home and creche of the National Asylum at Charenton, noticed in THE LANCET of July 3rd, has met with such objection on the part of alienists that the Ministry of Hygiene has modified its decision. At present 500 mental patients occupy the asylum, which has accommodation for 1500. These 500 will remain in one wing of the vast building, and as they die out—the mortality-rate is admittedly high—their places will not be filled. From now on 1000 beds will be reserved for the Institute of Puériculture, providing accommodation for about that number of recently confined women, who will stay there with their infants for an average of two months. The number of these occupants will gradually increase in proportion as the others disappear.

DONATIONS AND BEQUESTS.—By the will of the late Mr. George Paxton, of Primrose Hill-road, N.W., manufacturing optician, the testator left the following bequests to hospitals, provided that the business relations between Messrs. Currie and Paxton and the hospitals still existed at the date of the will: £250 to the Royal Eye Hospital, St. George's Circus, S.E.; £200 each to the Central London Ophthalmic Hospital, the Western Ophthalmic Hospital, London, and the Bristol Eye Hospital; £150 to the Bristol Eye Dispensary; and £100 each to King's College Hospital, St. Thomas's Hospital, Middlesex Hospital, University College Hospital and the New Hospital for Women, London.

Notes, Short Comments, and Answers to Correspondents.

THE INCIDENCE OF FATAL RHEUMATIC HEART DISEASE IN BRISTOL, 1876–1913.[1]

BY CAREY F. COOMBS, M.D., F.R.C.P. LOND.,
ASSISTANT PHYSICIAN, BRISTOL GENERAL HOSPITAL; HONORARY CONSULTING PHYSICIAN FOR DISEASES OF THE HEART, MINISTRY OF PENSIONS, S.W. REGION.

IN the Annals of the Gloucestershire Medical Society[1] it is stated that on July 29th, 1789, Mr. Edward Jenner "favoured the Society with Remarks on a Disease of the Heart following Acute Rheumatism, illustrated by Dissections." At the same time Dr. David Pitcairn, who was physician to St. Bartholomew's Hospital from 1780 to 1793, was teaching—to quote Sir Norman Moore[2]—"that valvular disease was a frequent result of rheumatic fever." Since their day the cardiac lesions have come to be regarded more and more respectfully, while at the same time it has become clear that the joint lesions, though painful for a time, lead but seldom to any lasting impairment of function. The present-day view is, indeed, that carditis is the disease and polyarthritis one of the complications. To use Sir Norman Moore's[3] words again: "Remembering the unwillingness of men and women to learn that they have diseases associated with the lungs or heart, I feel that 'heart fever,' which would be an appropriate term for a disease of which the most serious feature is endocarditis, would have little chance of coming into use instead of rheumatic fever. Were it not for this difficulty on the side of public opinion ..... the term 'heart fever' might with advantage be adopted for that morbid condition in which endocarditis, transient arthritis, and raised temperature are always present." The instructed point of view, then, is that acute infective pancarditis is a specific disease complicated by polyarthritis, chorea, and so on.

This view is borne out by more minute inquiry into the nature of the disease. When I was a senior student at St. Mary's Hospital Dr. F. J. Poynton and Dr. A. Paine[4] were publishing their papers on the "*Micrococcus rheumaticus*." I was able later[5] to bring support to their views by showing that the tissues react in a certain definite way to the attack of this micro-organism; while in 1912 Dr. R. H. Miller, Dr. E. H. Kettle, and I[6] found that the reactions provoked by experimental inoculation with the micrococcus were similar in essentials to those found in man.

Now, I assume that everyone is agreed upon the vital need for getting rid of rheumatic carditis and its crippling results. This can only be done by discovering first the means by which the organism gains its access to the cardiac tissues. For reasons I gave long ago,[7] reasons apparent to all who study the subject, it seems clear that there is no question of continued reinfection of the host from without; the history of the disease is one of attack after attack, at intervals of months or years, extending over a decade or even more. The organism, therefore, is one that persists in the body for long periods. General considerations lead me to suppose that it is not in the cardiac tissues themselves, but at some point within the body, outside the circulation but with ready access to it, that it lives on from one outbreak to the next. Most likely it is closely related to the cocci that normally live on the mucous surfaces, especially those of the alimentary tract. Thence it passes into some intermediate tissue (probably the lymphoid aggregations), where its virulence is enhanced to the level of pathogenicity. From this in turn it escapes into the blood serum, under conditions predisposing to its increase in virulence, in small but repeated doses, and attacks the heart with irremediable results.

It has therefore seemed to me worth while to try and find out something about the external conditions that predispose to pathogenic action by this micro-organism. With this end in view I set out to explore the incidence of rheumatic heart disease in Bristol, in its relation to time and place. The difficulties of notification are very great, so I did not feel called upon to attack the problem in that way until I had tried a simpler method. Hospital figures, again, are so obviously incomplete as to furnish nothing except what would mislead. It did not seem possible to approach the matter except through the death registers of the city. This was undertaken, therefore, with the aid of a grant from the Research Committee of the University of Bristol Colston Society. I have also had the benefit of much advice from Dr. D. S. Davies, the medical officer of health for Bristol; and the skilled and energetic assistance of his clerk, Mr. W. N. Brown, of whose help I cannot say too much. Indeed, with so much support I feel I ought to have accomplished far more than I have done.

[1] Read to the Thirty-first Congress of the Royal Sanitary Institute at Birmingham.

The Method of Investigation Used.

The method adopted was to go through the death registers from 1876 to 1913 inclusive. Deaths from "acute rheumatism" and "rheumatic fever" were noted, also deaths from "rheumatic heart disease," "rheumatic pericarditis," and so on; and after much casting about I decided to include also all deaths from "pericarditis" and "endocarditis" occurring before the age of 25, unless the cause of the lesion was stated to be something other than rheumatic infection. (I chose this age after investigation of the age-incidence of rheumatic infection of the heart from hospital records.) I assume that practically all these deaths are due to the cardiac lesions, even where the certificate does not mention cardiac manifestations.

What I was trying to do was to make a list of deaths from active rheumatic infection of the heart. For the purpose of relating the onset of infection to locality and season it would be useless to include cases of post-rheumatic heart disease, since the course of many of these covers several decades and removes the death far from the time and place at which the infection first began. For the purpose of estimating the number of deaths attributable in each year to rheumatic infection of the heart and its after-effects I made lists for the years 1876, 1886, 1896, and 1906, which included deaths not only from the causes I have named but also from heart disease of all kinds before the age of 40 (excluding congenital lesions and ulcerative endocarditis). Anyone who has examined numbers of cases of cardiac disease post mortem will agree that practically all such cases are of the rheumatic type. Syphilis rarely kills by its cardiac lesions before 40. In these four years I have named, the average annual number of deaths from rheumatic heart disease as I have defined it, in all its stages, was 71 (73, if deaths from chorea be included) in an average population of 251,974. This, I feel sure, is an under-estimate, because many people do not die of post-rheumatic heart disease till after 40, and also because many cases of ulcerative endocarditis (not included in my total of 73) are due in part to a previous rheumatic infection of the valves. And even if the figure were correct for the mortality bills, they render no account of the progressive crippling of activity during the productive decades which is so deplorable a feature of the disease. As it is it seems to me serious enough to think that for every million city dwellers there should be 300 deaths from this disease each year; for I take it that Bristol is no worse off than other British cities in this respect. Curves of death-rate show that the death-rate from rheumatic heart disease is not dropping as sharply as the general death-rate. It is therefore a matter serious enough to justify a searching inquiry.

I am only too aware of my amateurish methods and unsatisfactory data. Before I had gone far into the death registers I saw that these records were not accurate enough to justify any minute deductions, yet it did seem to me that they might, on searching, reveal some features so striking as to give one a lead to further inquiry. I am afraid I cannot claim any very convincing results; but such as they are I bring them forward.

Seasonal Variation of Fatal Rheumatic Carditis.

The first point to which I ask your attention is that fatal rheumatic carditis appears to own a seasonal variation. The incidence is maximal in December and January, minimal in July and September. This corresponds broadly with rheumatic fever curves from the Scandinavian countries (Newsholme[8]). Comparison with charts of average rainfall and mean temperature seems to show some relation between high rheumatic incidence and low rainfall, and also high monthly mean temperature. In order to examine these possibilities in more detail a chart was prepared, by means of which we were able to compare, month by month, the rheumatic incidence with the rainfall and the mean temperature. There were six principal "spikes" upward in the rheumatic curve; in 1877, 1881, 1886, 1893, 1901, and 1911. The first two and the last two coincided with a low rainfall, but there was no clear relation to the temperature curve. Again, on six occasions the monthly rainfall exceeded 7 inches, and each occasion coincided with a low incidence of fatal rheumatic heart disease. Further, a sustained drop in the rainfall appeared to be followed by an increase of fatal carditis. The same fact has already been observed, in regard to rheumatic fever, by Sir A. Newsholme,[9] and on much wider evidence. He explained it by saying that scanty rainfall caused a warm and dry subsoil, usually with an exceptionally low ground water. But a similar examination of the temperature curve fails to prove that it had any definite relation to the rheumatic incidence.

Geographical and Geological Inquiries.

The possible effect of locality was explored by marking the houses in which a death from rheumatic infection had occurred with a dot for each house, on a map of Bristol

coloured to show the various geological formations. A street index of the deaths was also prepared. It must be confessed that neither of these plans brought to light anything definite. No epidemic was discovered, unless one takes note of a group of eight cases occurring within seven weeks (November and December, 1893) in a small area in the south-west centre of Bristol. During the same period only one other death was noted in the whole of the rest of the city. A search for "rheumatic houses" was fruitless. Only 11 houses were found in which more than one death from rheumatic infection had occurred; and in none of these had there been more than two such deaths. Moreover, in these instances examination of the facts did not warrant any belief in the house as a factor in the causation of the disease.

The map shows no relation between the geology of the city and the rheumatic incidence. Neither does it support the view that this disease is particularly fond of river valleys. The banks of the Avon and the Frome, with their ramifications, are not studded with dots in the map.

There are four areas in the city where 19, 20, or 21 dots are to be found within a square, the side of which is one-quarter mile in length. There is nothing in common between these areas except that they are all of them crowded with inhabitants. One of them is low down on a river bank, another is raised a little way above the river level by a sharp slope, a third is on one of the sharp inclines that rise steeply from the centre of the city, and the fourth is on the edge of Durdham Downs, on the upper limestone. As to density of population, it does not seem to me possible to prove that the high incidence of fatal rheumatic heart disease in these areas means anything more than that where more people live there also more people die. I have tried to find some relation between the incidence of carditis and the density of population by comparing the ascertained densities of the various registration areas with the rheumatic death-rates in those areas, but no such relation can be discovered.

Suggestions for Further Investigations.

Yet there is one last point of some significance. When he was preparing the charts Mr. Brown pointed out to me that the extensions of the city in 1897 and 1904 did not add much to the total numbers of deaths from rheumatic infection. Indeed, when we examine the curve of rheumatic death-rate we find that these inclusions coincided with a drop in the rate. When outer areas were added to the relatively congested centre a fall in the rheumatic death-rate took place. Is it not probable that the explanation may lie in the relatively rural and uncrowded character of the areas brought in? I think this is a possibility well worthy of exploration. This leads me to conclude with a brief outline of plans for further research. The present inquiry shows that rheumatic infection of the heart is killing 70 or 80 people every year in Bristol, to say nothing of the decade or more of lessened efficiency that precedes a majority of those deaths. The mortality figures, imperfect though they are, do not point to any great natural fall in the incidence of this disease. They show that when the city has been "countrified" by inclusion of partially rural areas the death-rate from this disease has fallen. The winter rise in its seasonal curve is at the most only partially explained by reference to climatic conditions. Is it not possible that there is an economic factor in the causation of this infection?

To put such a question is one thing; to answer it is another. But it does appear to me that we ought to try. Data as to the incidence of rheumatic carditis must be collected from an area wide enough to include rural as well as urban districts. The first difficulty is to determine what we are to regard as rheumatic carditis. I do not at present know of any specific test, and we must rely on the judgment of the practitioners in the area selected, aided by some kind of definition of the cases to be noted, and, if possible, by referees with special knowledge of the disease for doubtful cases.

I think some little time should be spent in explaining the nature of the investigation, so as to enlist the enthusiastic help of the medical men concerned. For the reports which they would be asked to make adequate payment must, of course, be arranged. I do not know of any area more suitable from the economic point of view than that surrounding Bristol, and I hope it may be possible to organise the inquiry in that area. It will take two or three years to get ready for it, but I believe my Bristol colleagues will help, while so far as Gloucestershire is concerned it seems to me that the medical organisation which we all associate with the name of Dr. Middleton Martin will greatly facilitate these preparations. And I must confess that it seems to me peculiarly fitting that we should look for a lead in this matter to the general practitioners of the very county in which that prince of general practitioners and clinical observers, Edward Jenner, read to the Medico-Convivial Society of Gloucestershire in the parlour of the Fleece Inn at Rodborough, "Remarks on a Disease of the Heart following Acute Rheumatism," which entitle him to claim with Pitcairn the honour of initiating the campaign that we are now taking up against this crippling and destructive infection.

References.—1. Quoted in Brit. Med. Jour., 1896, i., 1296. 2. Lumleian Lectures, THE LANCET, 1909, i., 1159, 1227, 1297. 3. Loc. cit. 4. Researches on Rheumatism. 5. Journal of Pathology and Bacteriology, 1911, xv., 489. 6. THE LANCET, 1912, ii., 1209. 7. THE LANCET, 1904, i., 565. 8. Milroy Lectures, Brit. Med. Jour., 1895, i., 527, 581. 9. Loc. cit.

PESTILENCE IN THE NEAR EAST.

UNDER the title of "Health Conditions in Eastern Europe: Typhus a Serious Menace," Major F. Norman White, I.M.S., C.I.E., delivered an important lecture under the auspices of the Chadwick Trust at the Surveyors' Institution, Gt. George-street, Westminster, on July 15th, Sir William J. Collins being in the chair. Major White, who is a medical officer under the Ministry of Health, has just returned from Eastern Europe, where, as Commissioner for the Typhus Commission of the League of Nations, he has been visiting the infected areas. The countries chiefly considered were Latvia, Esthonia, Lithuania, Poland, and the Ukraine, all situated on the border of Soviet Russia.

The Conditions in Russia.

With regard to Russia, said the lecturer, detailed information was lacking, but it was known that health conditions were appalling, and the incidence of typhus and other epidemic diseases had been exceedingly high. The deplorable situation in Russia was one of the chief contributory causes of the unhealthy conditions now prevailing in the countries under consideration. It was, however, difficult to appraise the degree of credence that could be awarded to such vital statistics as emanated from Russia in existing circumstances. He had been informed by Dr. Haden Guest, who had just returned from a mission to Russia, that during 1918–19–20 Russia and Siberia had been swept from end-to-end by typhus fever and that scarcely a town or village escaped. It was stated that some 50 per cent. of the doctors attendant on typhus fever patients had died of the disease. Recent cables stated that cholera is widespread in Southern Russia and is causing there a very high mortality.

Poland's Handicap.

Of the states involved Poland was the largest and the conditions there would apply almost equally to the neighbouring states. Through Poland passed most of the main lines of communication by road and rail connecting Russia with Western Europe, consequently the efficiency of Poland's organisation was a matter of very direct concern to Central and Western Europe. Poland, too, had suffered more from epidemic diseases than had her smaller neighbours and her task was the most difficult, though similar in kind. Poland's strenuous efforts to work out her own sanitary salvation in spite of overwhelmingly important preoccupations entitled her to special consideration. Poland was a densely populated country for its degree of industrial development, with 250 persons to the square mile. Sanitary conditions, even before the war, were in a deplorably backward condition. Only three towns of what was now Poland had anything like an up-to-date water-supply, and in Warsaw alone was there any modern system of sewage disposal. Facilities for cleanliness in the form of public baths and other conveniences were extremely deficient. Scavenging was inefficiently carried out. The standard of personal cleanliness was low, especially in the poor Jewish quarters of the towns. The death-rate was very high, though coincidently a very high birth-rate (40·6 per 1000 in 1910) was probably a marked feature of the vital statistics. Tuberculosis was prevalent in the towns. The infantile mortality-rate was excessive. The deaths of children under one year of age in the Austrian part of Poland during the quinquennium 1906–10 averaged 205 per 1000 births. Epidemics closely followed the outbreak of hostilities. In 1915 in a small part of Galicia that was free from Russian occupation there were 19,000 cases of typhoid fever, 11,000 of dysentery, 8000 of typhus, 21,000 of small-pox, and 29,000 cases of cholera. As the war progressed affairs became progressively worse. In 1917 the deaths outnumbered the births in every town and district of Poland. In that year the tuberculosis death-rate in Warsaw was 7·3 per 1000, and in Lodz 11 per 1000. Infantile mortality rates were higher than ever, and such diseases as rickets were said to be increasingly prevalent.

Typhus, Checked and Unchecked.

A serious epidemic of typhus still raged, more especially in Eastern Galicia, the conditions for its spread being particularly favourable owing to the devastation caused by war and consequent overcrowding. In Congress Poland 325,000 houses had been destroyed, and in Galicia 438,000. Soap, fuel, and other essentials to cleanliness were unprocurable in most parts, and elsewhere difficult and costly to obtain; changes of clothing were difficult to get; lousiness among the poor population was almost universal; dirt and

squalor characterised the poor quarters of the towns; privation, want, and disease had diminished the vitality and lowered the resistance to infection of large masses of the population and produced a condition of apathy that would be difficult to overcome. Over and above all this there had been a constant and continuous stream of civil and military refugees crossing the Polish borders, many of them infected with typhus contracted in Russia; the vast majority of them were infested with lice and other vermin. Between November, 1918, and January, 1920, 653,000 prisoners of war of all nationalities passed westwards over the Polish frontier, as well as 627,000 emigrants returning to Poland. These were all registered in the various posts through which they passed. In addition, some large numbers of refugees from the neighbouring war zone crossed the border. This primary source of infection of many diseases continued to operate. It was estimated that there were still a million persons in Russia waiting to be repatriated, and refugees and prisoners of war continued to increase the dangers of infection. All these unfortunate people came from areas where disease was already out of hand. The cessation of hostilities between Poland and Russia would not mean an immediate amelioration of these conditions and resumption of cross-frontier traffic, and trade would have its attendant public health dangers. In 1919 there were no less than 231,000 cases of typhus notified in Congress Poland and Galicia, and probably at least half the total number of actual cases were unnotified. During a short tour which he (the lecturer) made last month in Eastern Galicia scarcely a town or village was free from typhus, and this at a time of year when conditions should have begun to improve. There were good grounds for regarding the outlook for Galicia next winter as serious in the extreme.

The persistence of typhus was, perhaps, a better index of insanitary conditions than is furnished by any disease. Where typhus abounded there most other epidemic diseases could flourish. In temperate climates, if conditions were such that typhus could not flourish, the incidence of most other communicable diseases was likely to be low. Dangerous foci of epidemic disease were of more than local importance; mankind could not with impunity suffer plague spots to persist, especially when situated in the midst of civilised Europe. Persistence of present conditions would entail a never-ceasing vigilance on the part of the health authorities of more happily placed countries such as our own, and even then the disease might break through our barriers. This was well illustrated by the serious epidemic in Holland, a peaceful, well-fed, and prosperous country, in 1918. The menace of typhus was a very real one.

Interaction of Disease and Social Unrest.

The persistence of typhus and other epidemic diseases in Poland and adjacent countries was in part an economic question. High prices, scarcity of food, underfeeding, overcrowding, were all factors that no epidemiologist could overlook. Undue prevalence of disease might in its turn be directly responsible for such economic conditions as prevailed in Eastern Europe, and was a factor of great moment in keeping the populations in a state of constant ferment. Improved economic conditions were almost impossible in existing health conditions. At the root of inefficient labour, deficient output, and industrial unrest there often lay a removable pathological cause whose consideration would lie within the legitimate scope of the public health of to-day. Prevalence of disease might likewise play no insignificant part in the production of such social unrest as at present characterised Russia. A return to more normal conditions—political, social, and economic—on the continent of Europe had little likelihood of being attained unless and until the health conditions underwent substantial ameliorations. Excessive prevalence of disease, too, had a markedly deleterious effect on the physique and development, both physical and mental, of the rising generation, while education was retarded. All these things were factors in unrest.

Present and Future Needs.

The League of Nations had recently created a Typhus Commission, whose function it would be to aid the Eastern countries in their great health task. It was hoped that two million sterling would be raised, the minimum amount necessary to render adequate help. In addition the League of Red Cross Societies was issuing an urgent appeal to supplement the work that was already being done by voluntary societies. It was very desirable that adequate funds should be forthcoming sufficiently soon to enable next winter's epidemic of typhus to be forestalled. In the Baltic States conditions in regard to typhus fever had somewhat improved; Finland appeared to be practically free from the disease. In Esthonia there were less than 200 cases, in Latvia 879, and in Lithuania 590. In these countries American Red Cross doctors were rendering valuable aid in controlling the disease. There was very little typhus at present in Roumania, and it was chiefly confined to the Northern districts bordering on Galicia, the Ukraine, Bessarabia, and Maramures. In the Ukraine conditions had been very bad, and from 10 to 15 per cent. of the population had succumbed to typhus or relapsing fever. But generally the outlook was grave enough to call for immediate palliative measures. The lecturer's recent visit to Poland on behalf of the League of Nations had been made with the primary object of ascertaining how foreign countries could best supplement Poland's efforts in the anti-typhus campaign. The best possible use was already being made of the very inadequate resources, and the energy displayed by the Chief Epidemic Commissary in Galicia was worthy of admiration. The plan adopted by the Polish Ministry of Health included arrangements for the establishment of a series of quarantine and observation stations along the Eastern border of all the main roads and railways, where refugees and emigrants could be cleansed, fed, and clothed, each station having a hospital attached to it; the establishment of hospitals in each district for the reception of cases of infectious diseases, also the establishment of corps to clean up infected houses and villages; and the installation in towns and villages of bathing, cleansing, and disinfecting plants. Essential, however, as this scheme was in all its details, it was quite beyond the resources of the Polish Government at the present time. Additional hospital material for at least 20,000 beds with full equipment was needed at once, disinfecting apparatus in large amount was required, clothing for refugees was an indispensable necessity, and would entail a very large expense. The rags of the refugees fell to pieces if attempts were made to rid them of vermin, and during the next twelve months something like two million shirts and a proportionate amount of other clothing would be called for. Soap in almost unlimited amounts was required, and certain foodstuffs for the quarantine stations and hospitals were needed, together with transport vehicles. Doctors and nurses were required to supplement the work of the insufficient and overworked Polish medical personnel. Only adequate help from more fortunately placed countries would rid Europe from what was a very real peril.

In concluding, the lecturer paid a warm tribute to the work of the American Red Cross, the "Hoover" Organisation, the European Children's Relief Fund, which during the past few months had provided 1,300,000 persons with one meal a day, the Jewish American Joint Distribution Committee, the National Alliance of American Poles, the Society of Friends, the American Typhus Relief Expedition, the Polish Red Cross, the British Red Cross, and the League of Red Cross Societies.

PUBLIC HEALTH IN TASMANIA, 1918-19.

SOME important advances in public health legislation in Tasmania were made by the passing of the Hospitals Act (1918), the Midwives Act (1918), and an Amendment to the Public Health (Venereal Diseases) Act of 1917. By this last measure a medical practitioner who has reason to believe that a patient suffering from venereal disease intends to contract marriage is directed to notify his belief to the chief health officer, who shall thereupon inform the other party to the proposed marriage or the parent or guardian of such party. No liability for defamation shall be incurred by a practitioner making such notification in good faith. Dr. A. H. Clarke, the acting chief health officer, considers that the same privilege should be extended to practitioners making similar communications in good faith in the case, e.g., of men with syphilitic sores on their hands who have the handling of food for human consumption. It is satisfactory to learn that the venereal disease notifications, numbering 366, during the 12 months from July, 1918, to June, 1919 (of which 307 were for gonorrhœa), were 77 less than in the 12 months preceding. Dr. Clarke points out, however, that "until facilities are provided in every important centre of the State for the treatment of persons suffering from venereal disease it will not be possible to grapple with this important health problem." Diphtheria was prevalent (737 cases and 17 deaths), but evidently in a very mild form; about a quarter of the cases occurred in Launceston. There were 189 cases of phthisis and 144 of typhoid fever throughout the State and no other disease prevalence of any importance. Dr. Clarke describes the scheme of operations that was decided on in the event of influenza appearing in epidemic form in Tasmania, but happily no cases had occurred up to the date of this report (August, 1919).

THE GOLDEN RULE AS APPLIED TO TUBERCLE.

GIVING evidence on Feb. 3rd, 4th, and 5th, at Washington, before the Committee on Public Buildings and Grounds of the House of Representatives, Dr. E. R. Baldwin emphasised the need for providing attractive, as well as hygienic, accommodation for consumptives. "..... Whatever buildings the United States Government constructs, my advice would be, as a tuberculosis specialist, and as a patient myself, not to put the tuberculosis soldier in a place you would not be willing to go to yourself. That is the crux of the thing."